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The aim of the study was to provide the Department of Health, Education, and Welfare with evidence as to the productivity of compensatory education (CE) programs for disadvantaged children, particularly the effects of Title I of the Elementary and Secondary Act of 1965 during its first year and a half. Data were collected on pupil performance and exposure to CE in 11 school districts (132 schools); in addition to achievement test scores for 1965-66 and 1966-67, information was gathered on the characteristics of the pupils, their schools, and their communities. Results indicated: (1) a slight decline in average pupil achievement level in the sample schools, (2) a slight improvement in achievement of pupils at the lowest achievement levels in their respective grades; and (3) considerable variation in changes in achievement among school districts. Preliminary results suggested that the amount of improvement was related to level of Title I expenditures. The overall study provided evidence that more specific studies were needed to properly evaluate the effects of Title I. Appendices contain technical discussions as well as supporting material for the main text. (JAM)

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SURVEY AND ANALYSES OF RESULTS FROM TITLE I FUNDING FOR COMPENSATORY EDUCATION

67TMP-115

GENERAL ELECTRIC COMPANY
SANTA BARBARA
CALIFORNIA

U.S. DEPARTMENT OF HEALTH, EDUCATION & WELFARE
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SURVEY AND ANALYSES OF RESULTS FROM TITLE I FUNDING FOR COMPENSATORY EDUCATION

FINAL REPORT

67TMP-115

1 March 1968

Submitted To
Project Officers
Department Health, Education and Welfare
Washington, D.C. 20211

TEMPO
GENERAL ELECTRIC COMPANY
WASHINGTON OPERATION

PREFACE

This report summarizes the work done to date by General Electric, TEMPO on Contract No. HEW-05-67-55, A Survey and Preliminary Cost-Benefit Analysis in Elementary-Secondary Education, Phase I. The study, which began 21 April 1967, was conducted as a joint effort with the Department of Health, Education and Welfare (DHEW) and the Office of Education (OE). Although this report is submitted as a final report on the above contract, it should be viewed as a progress report on the overall study, and should be added to the body of information which was reported earlier.

Two interim progress reports preceded the present report:

67TMP-67 (submitted 27 June, revised 21 July 1967)

67TMP-89 (submitted 15 September 1967)

The June report describes data collection formats and discusses problems in data collection. The proposed analytical approach is presented in detail.

The September report summarizes the fourteen field trips conducted in the study and provides descriptive information on those compensatory education (CE) programs. The trip reports provide descriptions of the information and impressions obtained from visits to fourteen school districts.

The trip reports are reprinted as a separate appendix to this report.

SYNOPSIS OF WORK

The first several weeks of the study were devoted to designing analytical approaches and planning a survey of CE programs in selected school districts. Models for testing the statistical significance of observed changes in selected pupil performance measures were developed and presented in 67TMP-67, the June progress report.

Plans to obtain data on pupil performance and exposure to CE were expanded to include information on the characteristics of the pupils, their schools and their communities. The large variation in these later variables was judged as important for explaining observed changes in pupil performance between 1965-66 and 1966-67.

Following guidelines of the Office of Education (as contained in their financial and pupil accounting handbooks), special forms were designed to obtain data in a standardized fashion to conserve the time of school personnel. (The forms are displayed in 67TMP-67.)

The fourteen school districts included in the study were selected by DHEW but were not intended to be representative of all school districts pursuing compensatory education programs. Rather, for most of the districts selected, there was reason to believe that successful programs were in progress in at least some of the schools. One objective of the study was to investigate the characteristics of programs which held promise of favorable impact on the performance of deprived children.

The field trips were made by joint teams of DHEW, OE and TEMPO personnel and entailed 3-day to 2-week visits to each district. Undoubtedly more time would have been helpful in every case but the need to visit many locations in order to expand the sample sizes of schools and programs was considered more important. One negative effect of the intense travel schedule was the inability to summarize and analyze adequately the information and impressions after each trip.

Problems encountered in collecting information provide insight into the complexity of such a study and are, therefore, useful background information. Briefly stated, the more severe problems were:

- amount of detailed information required for making performance measures compatible is very great and the number of special conversion factors that are required prevents extensive use of automatic data processing;
- achievement scores came from different tests and came from tests which were administered at different points during the school year among and within the sample districts;
- much of the readily available data on CE were not in usable form for study because they did not give information for specific grades;

- it was difficult to distinguish between CE and regular school programs and between CE programs funded by federal and non-federal agencies;
- the large transfer of pupils into a sample school makes it difficult to identify the amount of CE to which pupils have been exposed.

Achievement data received from the school were reviewed for applicability in comparing 1965-66 with 1966-67 performance levels. Because of incompatibility and incompleteness of data, it was necessary to delete three of the fourteen school districts in the statistical analysis. The trip reports include information of fourteen school districts but the rest of the report is based on information from eleven school districts.

SYNOPSIS OF THIS REPORT

This final report consists of four sections, and seven attached appendices. An appendix of trip reports, prepared for use within DHEW and OE, has been bound separately to maintain the school-district anonymity requested for this report.

Section 1 describes the original study objectives and the technical approach used in analyzing sample data. It gives a brief summary of the final selection of observations for statistical analysis.

Section 2 presents the results of an analysis in which changes in achievement test scores and the association of changes with the specific state variables are examined. The variation in achievement test scores among school districts is described and a summary of the procedures used in processing achievement data is presented.

Section 3 analyzes the correlation between changes in achievement and Title I expenditures measured at the district level. It also illustrates, for two sample school districts, procedures used and problems inherent in determining the type and level of CE at the grade level in specific schools. It provides insight into variations in the type, purpose, duration and intensity of CE programs, and in the type of students involved in them, and the relationship of these programs to regular education programs.

Section 4 presents observations, conclusions and recommendations based on the Phase I effort.

The attached appendices contain technical discussions as well as supporting material for the discussions in the main text.

SUMMARY

This report analyzes data from a sample of 132 schools which received funds from Title I for compensatory education to aid educationally disadvantaged pupils. Most of the eleven school districts from which the schools were drawn were selected because there was reason to believe that successful compensatory education programs were in progress in at least some of the district schools. Conclusions are based on a comparison of achievement scores in 1966-67, after pupils were exposed to compensatory education from Title I funds, with achievement scores in 1965-66.

There appears to have been a slight decline in average pupil achievement level in the sample schools. For the entire sample the average grade equivalence score in 1966-67 was approximately one-half month lower than the corresponding grade equivalence score in 1965-66. The percentage of the pupils in the 1966-67 test results who also participated in programs funded by Title I is not known but is believed to be less than 50 percent.

On the other hand, there appears to have been a slight improvement in achievement of pupils who are at the lowest achievement levels in their respective grades. The average grade equivalence score of pupils at the lowest decile in the 1966-67 tests was approximately one-fourth month higher than the average grade equivalence score of corresponding pupils in the 1965-66 tests. Although the one-fourth month change is very small, it is statistically different from the observed negative changes in both the mean score and the score at the upper quartile.

There is considerable variation in changes in achievement among school districts. One district shows a statistically significant increase in the average score while two show significant declines. With respect to achievement at the lowest decile, none of the school districts shows significant decrease, but two districts show significant increases.

The very preliminary results suggest that amount of improvement is related to level of Title I expenditures. The districts which showed the largest improvement at the lowest decile are the districts which had the higher average Title I expenditures per pupil.

The two variables most closely related to changes in achievement are initial achievement level and percent Negro. Lower initial achievement levels in 1965-66 are associated with larger gains between 1965-66 and 1966-67. This suggests that the availability of Title I funds is probably helping pupils at the lowest achievement levels the most. Schools which had 40 to 60 percent Negro pupils showed the poorest response to compensatory education programs. Schools with 0 to 20 percent Negro pupils showed the best response.

Examinations of schools in two districts reveal extremely wide variations among schools and among grades within a school in expenditures for both regular school programs and compensatory education programs. In one of the districts there was a positive correlation between changes in achievement and total expenditures but in the other district no significant relationship could be detected.

The overall study provides considerable evidence that more specific studies are needed to properly evaluate the effects from Title I. In addition, more emphasis should be placed on getting participating schools to keep systematic records on pupil, school, and program characteristics. The records from many schools are not adequate for the types of analysis required for proper evaluation of compensatory education.

It is always possible that the positive changes which have been attributed to CE are due to sampling variation. However, it must be recognized that to judge statistical results as insignificant also involves risk. There can be a loss to society in failing to support a program that is actually successful but available data do not clearly indicate the success. TEMPO relates the above conclusions and the detailed discussions in the remainder of the report as an objective evaluation in light of available data. It must be kept in mind that Title I funded programs were still relatively new at the time of 1966-67 tests and it is not reasonable to expect large gains in achievement so soon.

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SECTION 1

INTRODUCTION

STUDY OBJECTIVES

The study is aimed at providing the Department of Health, Education, and Welfare with evidence as to the productivity of compensatory education (CE) programs for disadvantaged children. The study has focused particularly on the effects of Title I of the Elementary and Secondary Education Act of 1965 during its first year and a half of operation. The specific objectives of the study were to answer the following questions:

1. Has statistically significant enhancement of pupil performance resulted to date from CE programs?
2. What school, pupil, and environmental characteristics are associated with enhanced pupil performance?
3. What are the distinguishing features of successful CE programs?

Initial study plans included the following measures of enhancement: achievement test scores, attendance rate, drop-out rate, and frequency of disciplinary actions. The effect of CE was to be measured by comparing results on each measure before and after exposure to CE. However, because of time constraints, it became necessary to restrict analysis to achievement test scores and attendance.

Within a school district each grade level received the same test throughout the district. For each grade, one sub-portion of the test was selected as a measure of achievement. In most cases this was the reading sub-portion, but in some cases a suitable but related subportion was used.

The objectives and measures of student performance used in this study are short-range ones; they do not deal with duration of changes nor was an attempt made to forecast the students' future performance and earning power or benefits to society. Although these longer-range objectives and associated measures would be more appropriate and revealing as to the productivity of CE programs, such an approach would require a much longer and different kind of study. However, it is believed that the present approach, which deals with the immediate and observable impacts of CE programs, is an essential first step in any examination of longer-range impacts.

SUMMARY OF DATA COLLECTED

The Office of the Secretary, DHEW, and the Office of Education selected school districts (see Table 1) from which to obtain data for this study. Most of the districts selected were those for which there was reason to believe that successful CE programs were in progress in at least some of the schools. In each of these districts a sample of schools was selected so as to include high, medium, and low rankings on each of the following characteristics:

Student Attributes:

1. Educational deprivation
2. Economic deprivation
3. Mobility
4. Grade level.

School Attributes:

1. Size of enrollment
2. Racial composition
3. Attendance rates.

CE Program Attributes:

1. History of prior CE programs
2. Intensity of current CE programs.

In each school district, schools eligible for ESEA Title I support were identified, pertinent characteristics recorded, and a sample chosen so as to include the desired wide range of values for each of the above characteristics. For example, in a given district, several schools were chosen with predominantly Negro pupil populations but with different degrees of economic and educational deprivation.

Table 1. Description of sample school districts included in statistical analysis.[a]

School District	Type of Local Education Agency	Geographic Region
1	City	East North Central
2	County	South Atlantic
3	City	West North Central
4	City	East North Central
5	City	East North Central
6	County	South Atlantic
8	City	East South Central
10	County	West South Central
12	County	South Atlantic
13	City	Pacific
14	City	Pacific

NOTE:
[a] By agreement with DHEW and the participating school districts, the school districts will not be identified in the results of the study.

Within a given set of characteristics, selection was made without prior knowledge of the success of compensatory programs at any of the schools within a school district. Table 2 illustrates the spectrum of characteristics presented in one of the sample districts. A similar diversity of characteristics exists in other districts.

Field trips were made to fourteen school districts, but sufficient data for analysis were available from only the eleven districts shown in Table 1. The number of sample schools in each district that were included in the statistical analyses are shown in Table 3.

The principal types of data obtained for the fourteen school districts were: (1) achievement test scores, attendance records, and other available measures of pupil performance, (2) descriptions of compensatory education programs, (3) financial data describing expenditures for regular and CE programs, and (4) information on school and pupil characteristics.

The additional data, over and above those analyzed in this report, included some achievement test data on the 3 school districts not included in the statistical analyses and data for several prior years for several of the other school districts. Data already received include

Table 2. Characteristics of sample elementary schools in District 4.

School	Student Population (Oct. 1966 ADM)	Percent Negro (1966-67)	Sixth Grade Mean Reading Achievement (Percentile)[c]	Percent of Students Economically Disadvantaged[d]	Years of CE Programs by June 1967
4	1010	99	2	70	1-1/2
6[a]	1617	98	10	60	3+
1[b]	1193	95	8	75	3+
9	411	38	1	85	1-1/2
2	561	15	15	75	7
10	758	94	29	35	1
5	295	24	26	75	1
11	882	19	36	50	1-1/2
7	1330	97	41	35	1
3	541	38	45	45	1
8	661	4	52	35	1

NOTES:

[a] Intensive Teacher Aide Program in addition to Title I Teacher Aides.
[b] Special Remediation Program in addition to Title I Remediation Programs.
[c] Percentile rank within District 4, 1964-66.
[d] Family annual income ≤ $2,000 (1960 census data).

over 2600 grade-years and more than 250,000 pupil test scores. Substantial but varying amounts of information have been accumulated on other measures of pupil performance such as attendance and dropout records.

A considerable amount of information has been obtained on up to 37 different CE activities in each of these districts. Additional information describes characteristics of specific schools and pupils participating in CE projects. Financial data have been received from ten of the fourteen districts in varying degrees of detail. In the other four districts, total Title I appropriations are available from OHEW reports. Average expenditures of Title I funds per pupil in these districts up to the time of the 1966-67 achievement test varied from $21 to $140 (see Table 11 in Section 2, column entitled "Effective Title I Dollars per Pupil").*

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*These averages are total district Title I expenditures divided by total pupil population in all schools receiving Title I funds.

Table 3. School and pupil samples sizes for eleven sample school districts.

School District	Number of Schools in Sample		Total Average Daily Membership in Sample Schools 1966-1967
	Elementary	Secondary	
1	19	5	19,100
2	14	5	9,300
3	15	7	15,600
4	11	8	24,300
5	14	-	9,200
6	2	0	700
8	9	7	14,600
10	10	0	4,600
12	4	0	1,800
13	7	4	10,700
14	6	4	7,700
TOTAL	111	40	117,600

In addition to the basic data on test scores considerable information is available on the relationship among the following types of test records: standard T, national percentile, standard scores for various types of tests, grade equivalence and stanine scores. Information on the frequency of each type of test and the frequency with which tests are changes from year to year is also available. Since achievement tests were administered at different times during the school year, a discussion of the significance of the differing testing times in evaluating year-to-year changes has been presented in Appendix E, along with a summary of the testing schedules.

Frequent differences of definitions were found among school records. For example, some districts considered an excused absence as "present" for attendance records, others did not. Some computed pupil mobility for the school year, others for the calendar year. Records of pupil "drop-outs" were based on different definitions. The occurrence of ungraded schools required that an equivalent grade level of pupils be determined for purpose of comparisons. Sometimes as a result of these differences in definition, approximations, based on such data as were available, were required in order to create a set of comparable data (e.g., enrollment data had to be used in lieu of ADM*).

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*Average daily membership.

Some CE projects were defined in terms of activities or objectives such as remedial reading and English instruction for pupils from families where English is not spoken; other CE programs were defined in terms of resource inputs such as teacher assistants and dollars for school equipment. The latter definition permits simple accounting, but does not permit easy identification of all the resources involved in specific program objectives.

SUMMARY OF TECHNICAL APPROACH

In TEMPO's first interim report (67TMP-67, 27 June 67) a detailed discussion of the proposed technical approach was provided. In this report, discussion will be limited to a summary of the interim report and a short discussion of subsequent changes and additions.

Data from the eleven school districts were analyzed to provide an estimate of the effectiveness of CE programs by comparing achievement scores in 1966-67 (after schools had implemented CE programs funded from Title I) with achievement scores in 1965-66. In most cases, there was little or no CE funded from Title I up to the time of the 1965-66 tests.

An attempt was made to identify the student, school, and program characteristics that were most highly correlated with such changes in effectiveness. This approach allowed for the possibility that students from different socio-economic groups respond differently to the various CE programs. For example, a certain program or activity may be highly successful in one group but not in another group with different socio-economic characteristics.

The "fixed guide" approach was used because of the availability of achievement data from sample schools. In this approach the distribution of pupil test scores for a specific grade in a school in 1966-67 was compared to the distribution of test scores for corresponding pupils in the same grade and school in 1965-66. The statistical analysis included 314 specific grades (see Table 5, Section 2) representing approximately 35,000 pupils in each year. This means that there were 314 basic observations, however, there is still a choice as to which parameter(s) of the distribution should be used for measuring change in achievement. The analysis in this phase of work was limited to the following four parameters: change in mean test score; change in the test score at the first decile; change in the test score at the first quartile; and change in the test score at the third quartile.

In many schools there were several classes in each grade. The scores from each class within a grade were combined so that all pupils in a grade constituted one observation. This seemed advisable because there was no reliable way to select classes in each of academic years 1965-66 and 1966-67 so that they would be comparable except for CE programs. This procedure does, however, lead to another question in interpreting results.

The number of pupils in each of the 314 basic observations in each of the years 1965-66 and 1966-67 varied from 16 to 598. This raises the question whether each of the 314 observations should be given the same weight in judging the magnitude and statistical significance of average change in test scores between the two years. If longitudinal data (i.e., test scores for the same pupils in both years) had been used, the obvious choice would be to weight each pupil equally. However, in the "fixed grade" approach there is no unequivocal way to match individual pupils in 1965-66 with those in 1966-67. The choice was made to present two types of statistics, namely,

1. Unweighted averages and standard deviations of the 314 basic observations
2. Weighted averages of the 314 observations based on number of pupils in each observation.

The difference between the two averages can be easily discussed with the aid of Figure 1.

The data available for statistical analysis in this study were in the form indicated in the lower right box in Figure 1. However, when each observation is weighted by the sample size, it is equivalent to data appropriate for the lower left box. The distinction between left and right boxes is clear with respect to the average test score but it is not so clear with respect to test scores at the first decile, first quartile, and third quartile. The latter scores may represent the score of only one pupil even though there are 598 pupils in the grade. In the case of decile and quartile scores, it is best to think of the weighted average as representing a simple average of scores of all pupils who ranked within an interval, say, 8 to 10 percentile in their grade in their school. The interval concept removes the problem of a single score representing the decile or quartile score regardless of grade size.

	PUPIL	GRADE
LONGITUDINAL (e.g., comparison of pupil(s) score in 4th grade in post year with score of same pupil(s) in 3rd grade in pre-year)		
FIXED GRADE (e.g., comparison of pupil(s) score in 4th grade in post year with score of pupil(s) in 4th grade in pre-year)	$\text{ave}\Delta X = \frac{\sum_{j=1}^{314} [N_1 + N_2]_j [X_2 - X_1]_j}{\text{Total pupils post and pre}}$	$\text{ave}\Delta X = \frac{\sum_{j=1}^{314} [X_2 - X_1]_j}{314}$
	PRE YEAR: N_1, X_1 ;	POST YEAR: N_2, X_2

Figure 1. Definitions of types of data and types of conclusions.

The weighting process indicated by the equation in the lower left box of Figure 1 is not a simple average of pupils in an interval but represents an average of single scores adjusted for the greater stability (or confidence) in the measure (decile and quartile scores) for grades with a larger number of pupils.

None of the conclusions presented in this report are based on longitudinal data as represented by the upper two boxes in Figure 1. It is possible to use data from the lower boxes to make statements appropriate for the upper boxes but it requires some added data or assumptions.

Since data as to which pupils in sample schools received CE were not available, all pupils for which test scores were available were included in the sample. Measures of average achievement indicated in the upper part of Figure 2 are available but measures of potential achievement level indicated in the lower part are not.

If, for a given grade level, the gap between the two lines in the upper part of Figure 2 is increasing each year, the simple comparison of pre and post years is a biased measure of the effect of CE; that is, the average score for the pre year is not a good estimate of

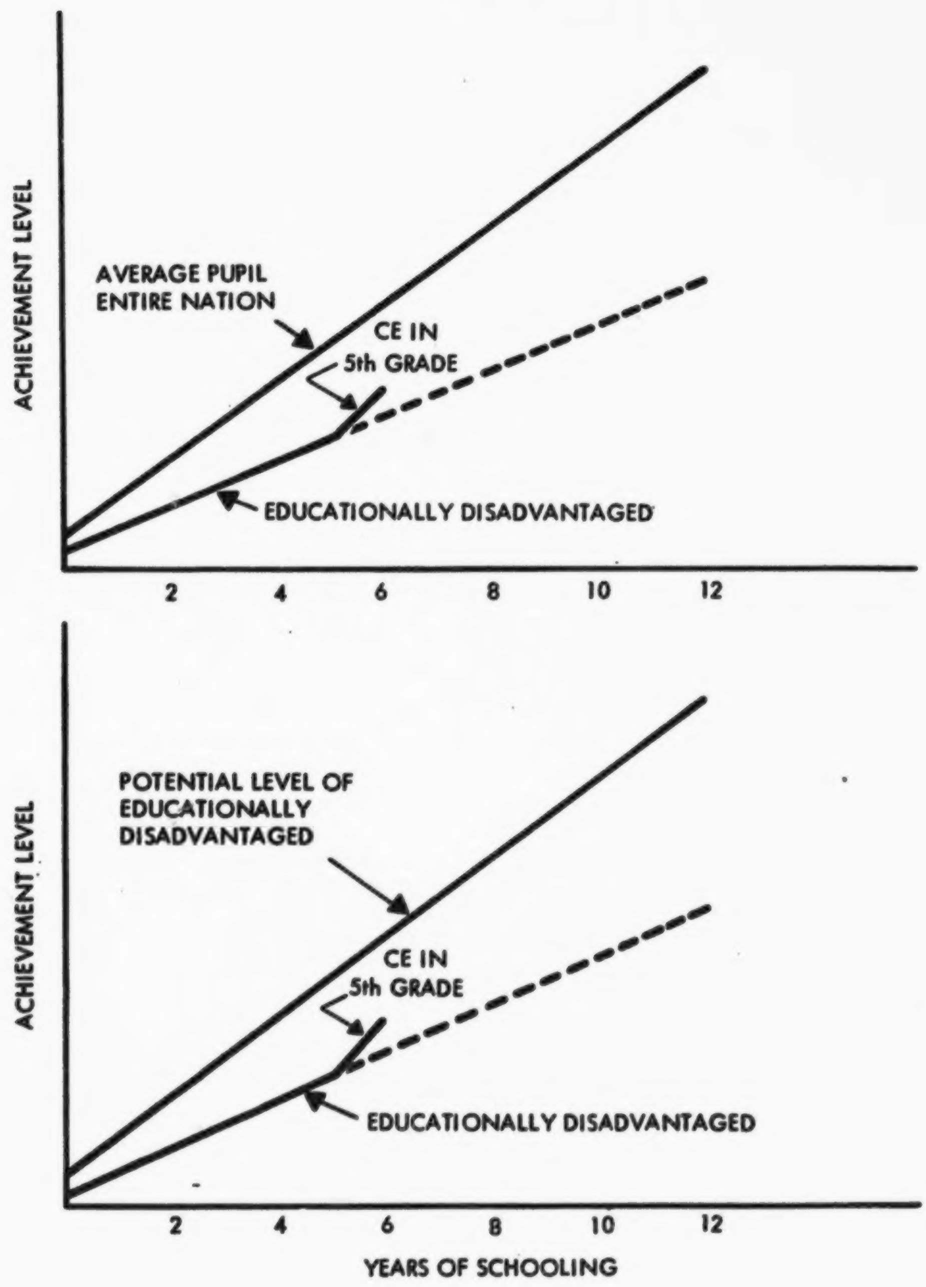

Figure 2. Measures of educationally disadvantaged and effect of CE.

the broken line in the upper part of Figure 2. In an attempt to compensate for this possible bias the analysis of pre and post test scores was extended to include analysis of the contrast between changes in the lower decile and changes in the mean and quartiles. The later analysis is based on the assumption that a high percentage of pupils in the lower decile of their class received CE but a smaller percentage of total pupils received significant amounts of CE. The specific statistical procedure for analyzing the contrast is given in Section 2.

The objective of the statistical analysis was to estimate the difference between pupil scores when they had CE and what their scores would have been in the absence of CE (broken lines in Figure 2). However, data on scores on the same pupils without CE are not available so most analyses were done by a straight comparison of 1965-66 and 1966-67 test scores.

The technical approach called for analyzing each of the 314 observations separately if statistically reliable results could be developed. This would avoid the problems inherent on averaging data from different tests and averaging data across different grade levels. It soon became apparent that this approach was not appropriate and data would have to be pooled. First, there is considerable variation in test scores between years that cannot be estimated from available data on the variation among pupils within a year. For example, the test could be given under very good conditions one year and poor conditions the other year. Second, the sampling variation in test scores was so large that few of the observed differences in pre and post scores for individual observations were statistically significant. Therefore, the scores were all converted to Standard T-Scores so that observations could be pooled. The assumptions underlying the evaluation of T-Scores for different grades and schools are given in Section 2.

In summary, the basic approach in Phase I was, first, to determine on a grade-by-grade basis whether significant enhancement had occurred and second, to identify whether, in the aggregate, the entire sample reflected significant enhancement. Regression analysis and analysis of covariance described in Section 2 were used to help identify student and school characteristics that are correlated with changes in student performance.

Statistical analysis is not sufficient for a complete evaluation of the compensatory education programs. Inconclusive results of statistical tests on selected measures of effectiveness do not prove lack of progress. First, they may indicate that the characteristics sampled by the selected measures were not changed by the programs; changes may have occurred in other characteristics that were not measured. Second, even if there may have been no short-term benefits, there may be latent long-range benefits that are difficult to forecast or identify after only one year of intensive nationwide compensatory activities. Third, the sampling variation in the relatively small samples might be too great to detect actual changes in achievement. Even when statistically significant results are obtained, these must be evaluated in light of other relevant information.

Limited attempt was made during the Phase I effort to collect several diverse types of information not amenable to formal statistical analysis but which might be useful in the overall evaluation of Title I programs. Some of this information is presented in trip reports in the separate appendix and some is presented in the detailed analysis of two school districts in Section 3.

SECTION 2

CHANGES IN ACHIEVEMENT TEST SCORES BETWEEN 1965-66 AND 1966-67

THE MEASUREMENT OF ACHIEVEMENT AND INFLUENCE OF TITLE I

The primary measure of achievement used in this study is the score on the reading sub-portion of various standardized achievement tests*. Obviously, this measure does not cover the entire range of objectives of compensatory education. However, reading is an especially appropriate element in the evaluation of compensatory education for several reasons: there is some evidence that verbal behavior may be more affected than other skills by cultural disadvantages (References 1 and 2), reading is a fundamental academic skill, and reading is part of all the major achievement tests used throughout the United States.

The study employs a "fixed-grade" approach in measuring the effects of compensatory education programs on achievement. The distribution of achievement scores for children in a particular grade and school for the year prior to compensatory education is compared with the distribution of achievement scores for children in that same grade and school in the following year, when compensatory education is implemented. An alternative method, the "longitudinal" approach, is to observe changes in scores of individual pupils in successive grades (i.e., the change between an individual's score in his grade prior to CE and his score in the succeeding grade after exposure to CE). The fixed-grade approach is based on results for two different sets of individuals and its usefulness and validity are influenced by our ability to identify and cope with the additional factors introduced by comparing results for two different sets of pupils.

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*There is one exception: in one district a composite score (i.e., an average score of several subtests of a test such as reading, vocabulary, spelling, language, arithmetic, etc.) was used because CE programs were known to be oriented toward other academic skills.

The longitudinal approach is attractive because it uses the same set of individuals but it requires comparing results in two (or more) different grades. But the comparison of achievement before and after compensatory education can involve large and possibly systematic errors because pre and post scores for each pupil would be based on different tests and evaluated against different norms.

In this specific study the choice of the fixed-grade approach was dictated by greater availability of achievement data and because school records do not link individual test scores with amount of exposure of the pupil to CE. Longitudinal data are very limited due to mobility of pupils, lack of records on individual pupils, and the general policy of not testing every grade every year.

Most of the analyses on Phase I were based on test data for two years, the 1965-66 and 1966-67 school years. Ideally, the "post" year (1966-67) would represent performance after exposure to Title I programs and the "pre" year (1965-66) would represent performance prior to exposure. However, some of the pre-year (1965-66) tests were conducted in the Spring of 1966 after Title I funding started. It is assumed that pupils tested in the Spring of 1966 showed no enhancement attributable to Title I. This assumption seems justified because Title I activities usually did not start until February 1966 and the activities often took months to get under way. Also, a large portion of the total first year outlay was for equipment and construction (Reference 3), which would take relatively long to have effect, compared to reading programs, for example, which might give fairly rapid enhancement.

Another assumption in a simple comparison of pre and post years is that the major positive changes in achievement test scores are due to benefits derived from Title I. The general descriptions received at the school districts support this assumption. Certainly for most schools sampled, the amount of special CE expenditures was greatly enhanced by Title I. Also, this CE was designed as an addition to the on-going school program, not a substitute for it. As will be seen later in this report, there is wide variation among grade units in both CE and regular program expenditures per pupil. This is a possible cause of large sampling variation in achievement test results.

The most important uncertainty with respect to judging the effects of CE on the basis of observed differences in scores in successive years is the possibility of trends in achievement which are independent of CE. There are several reasons for expecting a downward trend in achievement of pupils at inner-city schools (which constitute most of the sample) relative to the entire nation. First, there is an exit of middle and upper income whites to the suburbs (Reference 4). Second, there is an inflow of families from rural areas where the educational level of pupils is probably quite low. Third, riots and other forms of demands for racial and economic equality are disruptive forces that can hinder the educational process when these forces are being exerted.

A second source of systematic year-to-year change in achievement levels springs from the nature of achievement measures. In this case the expected trend is in the direction of improvement in average achievement level in successive years. Several test publishers* report that successive classes throughout the nation obtain higher scores on tests. It is not clear why this result occurs; it may be due to increased spread of knowledge, or to teachers incorporating test content into their teaching.† In any event, this trend makes test norms progressively obsolete. When this occurs, and at what rate, is not clear. However, from the publisher's SAT equivalence tables† this rate was estimated as approximating 0.5 Standard T-score units, per year. This is approximately a 0.05 increase in grade equivalence score per year (i.e., the upper line in the top half of Figure 2 is shifting upward). In analyses to date we have not taken potential trend influences into account. However, some achievement data for earlier years were processed to gain some insight on how trend information might be utilized. All of the data were from one district (8); they include five grade levels (4, 6, 7, 8 and 11) and four different years. A representative sample of these data was plotted and appears below as Figures 3, 4, and 5. These figures illustrate the difficulty in giving a precise interpretation to such information. There are some cases (for example, the graph of the 1st decile in Figure 3) where the achievement level moves rather erratically, and the existence of a trend is not obvious. In other cases (the graph of the 1st decile in Figure 4, for example) there is an apparent absence of any trend. A third situation is shown in Figure 5, where a trend is apparent in the lower decile and lower quartile, and one is tempted to predict what the 1967 level would have been in the absence of any CE by simple extrapolation.

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*See, for example, References 5, p 53, and 6, pp 28-29.

†See, for example, Reference 7, pp 152-155.

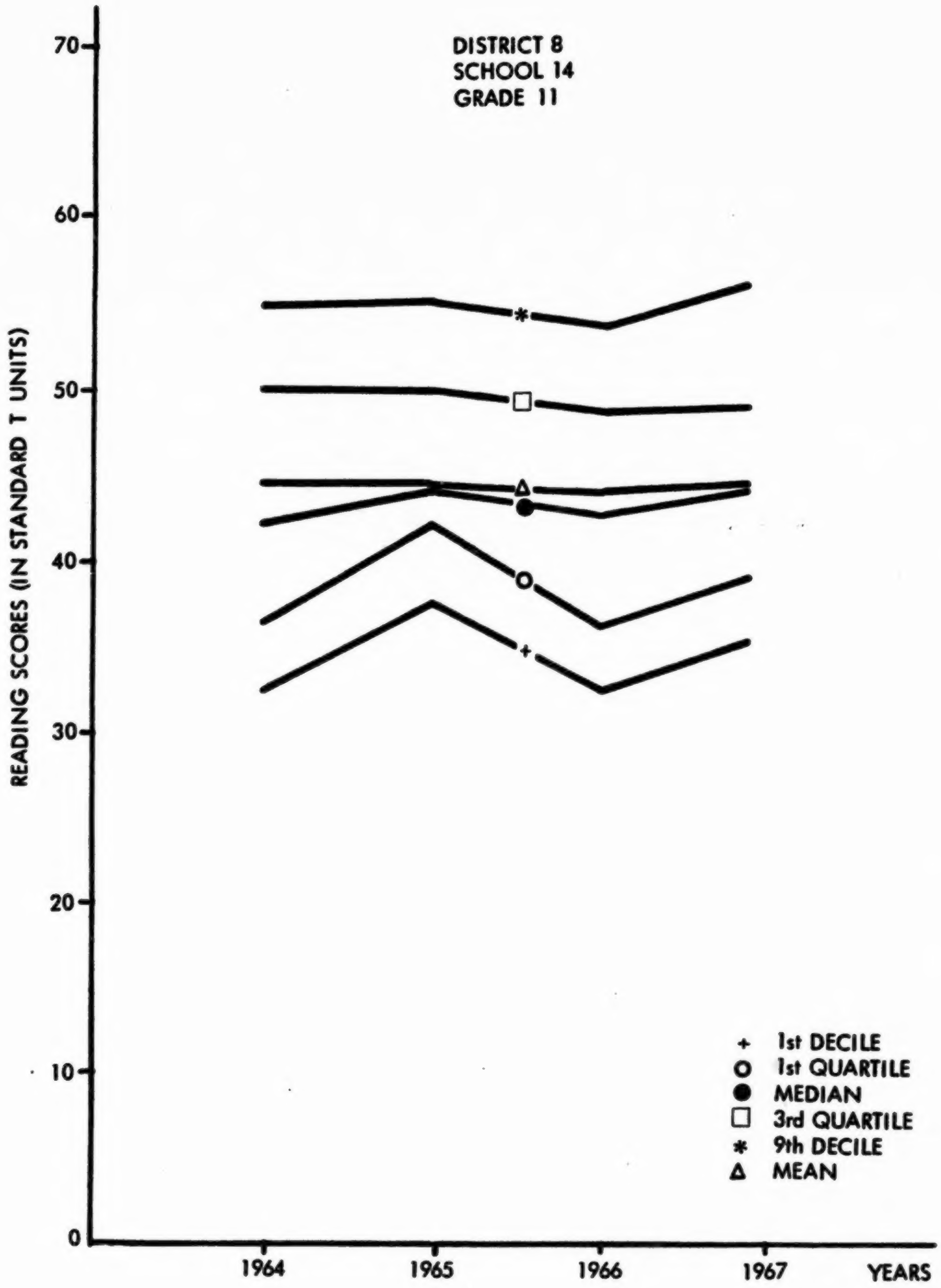

Figure 3. Trend in achievement level.

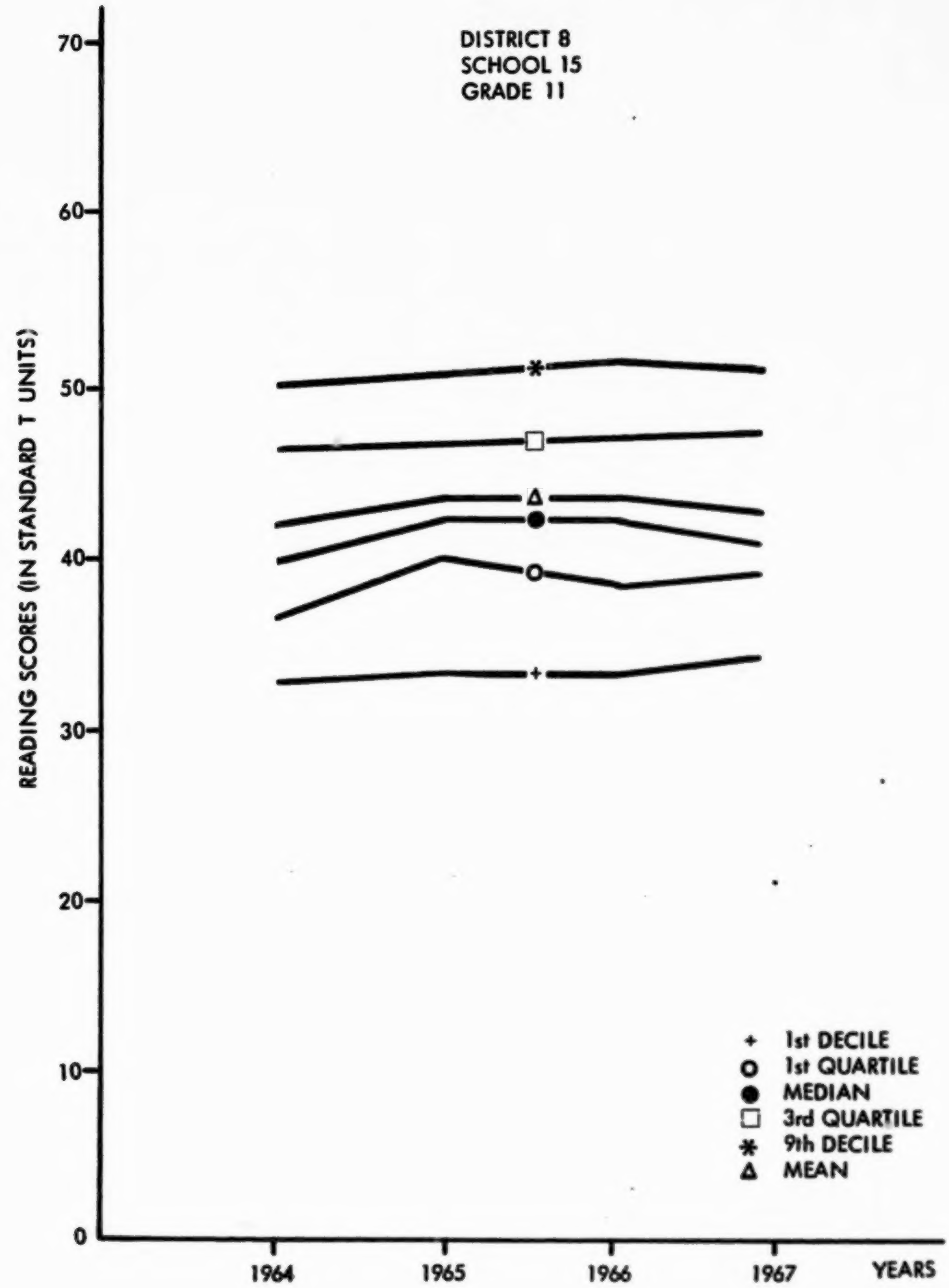

Figure 4. Trend in achievement level.

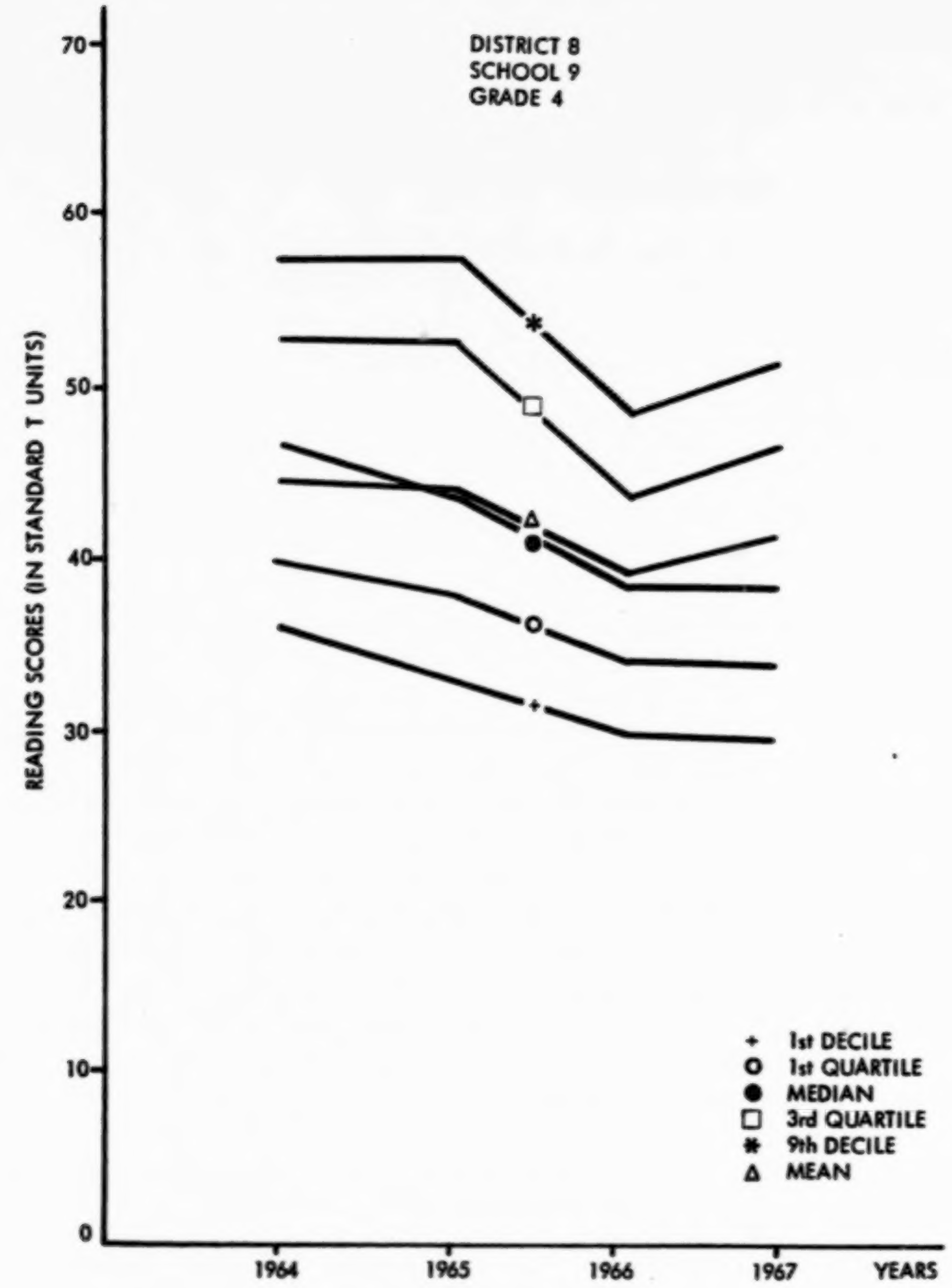

Figure 5. Trend in achievement level.

There are difficulties in interpreting changes in test scores in successive years in the fixed-grade approach when there is possibility of a trend in achievement level in the sample schools. It may be necessary to utilize the longitudinal method along with the fixed-grade method in order to develop more precise estimates of the effectiveness of Title I programs.

PROCESSING ACHIEVEMENT DATA

There are two main aspects in obtaining comparable units for observed differences in test scores. One is comparability over a range of achievement levels. The other is comparability among different tests and different test dates within an academic year.

The comparability over different achievement levels within a grade was obtained by converting to the Standard T-score. The scale for the Standard T-score has been constructed so that a change from 30 to 35, for example, is comparable to a change from 60 to 65. Comparable in this case means that the amount of effort in CE required to raise the achievement level 5 points is approximately the same in both cases. As a result, T-scores can be averaged and subjected to statistical analysis, whereas percentile scores, for example, cannot (Reference 8, p 64). In some of the analyses, results for different grades were combined and in these cases it was assumed that differences in T-scores are also comparable among grades. That is, the amount of effort in CE required to increase an achievement level from say 30 to 35 in one grade is approximated the same as for a similar movement in other grades. The T-score is computed directly from a percentile score (see Table 61). The second aspect of comparability among different tests and test dates enters through the use of the publishers' norm tables for computing percentile scores (see Table 60 as an example of this conversion). The assumptions used in computing percentile scores were:

1. The reading, paragraph meaning, and composite subtests measure the same pupil attribute
2. The publishers' norm populations for each test is similar with respect to the distribution of achievement levels
3. The publishers' norms provide proper adjustment for the time of year at which the test is given.

The first assumption was necessary because each of the three subtests was used in one or more school districts. Since our primary interest was in analyzing differences between pre and post test scores, it was not necessary to assume that norm populations were equal in absolute level, but only in the range and distribution over the range.

Each of these assumptions will be treated in more detail in the subsections below. One feature of the data deserves special notice. Since pupils in eligible Title I schools were selected for being culturally and educationally deprived, their achievement test scores tend to be lower than those of the norm populations. Figure 6 illustrates the distribution of achievement scores of a typical fourth grade in a sample school in 1965-66. Eighty percent of the pupils in this grade received test scores below the mean score of the pupils in the norm population. Table 11, discussed later, shows the mean achievement level (based on 1965-66 tests) for the entire sample and for sample observations in each district.

The major characteristics of the data received were as follow.

Type of Test

Data analysis was limited to standardized achievement tests administered to entire grades of pupils in a school district for each of

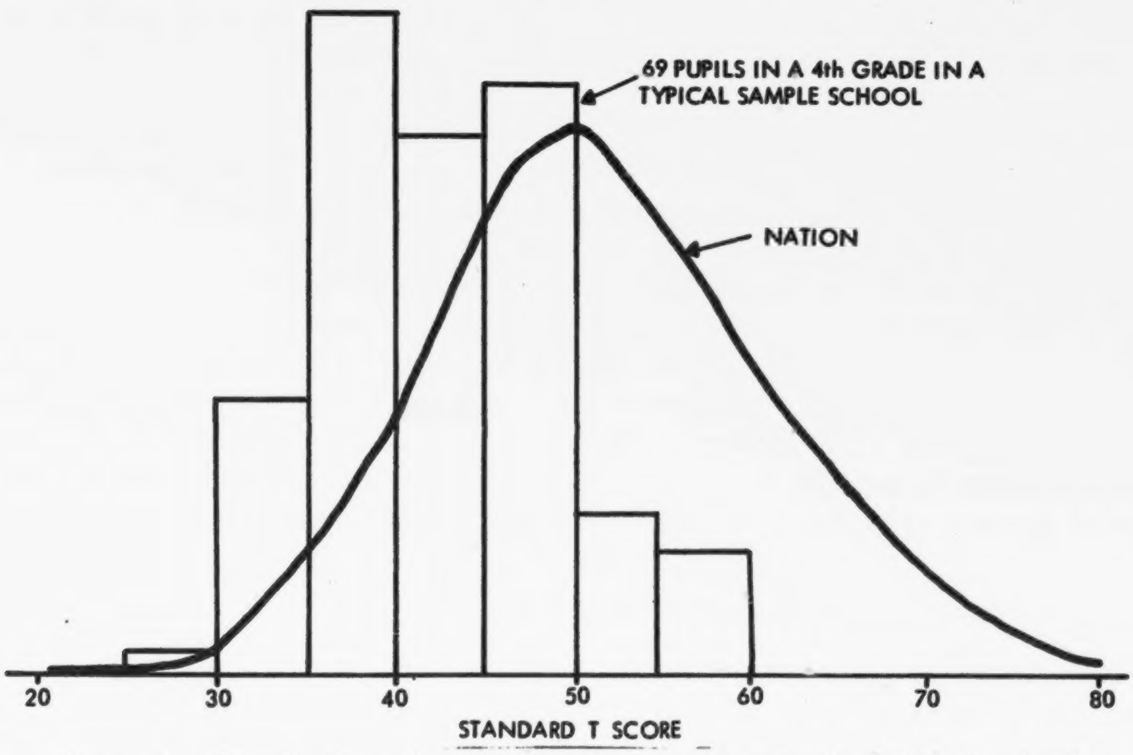

Figure 6. Distribution of achievement scores in a typical Title I school compared to that for the entire nation.

2 years, 1965-66 and 1966-67. In the 11 school districts, 5 different tests were used: Stanford Achievement Test (SAT), Metropolitan Achievement Tests (MAT), Iowa Tests of Basic Skills (ITBS), Iowa Tests of Educational Development (ITED), and Sequential Tests of Educational Progress (STEP). The variety of tests and subtests in different grades in the 11 school districts is shown in Table 4.

For any given test there was often variation in the forms used in the pre and post years. Usually this variation was between two forms which were constructed so as to provide equivalent measures of achievement. However, in cases where different editions of a test were used, raw scores were converted to a common scale, using publishers' norms.

Time of Testing

There was considerable variation in the time of the year in which tests were given among and even within school districts. This resulted in differences in amounts of CE to which pupils were exposed prior to the 1966-67 test. Such differences in exposure to CE cannot easily be taken into account in a simple comparison of pre and post test results but can be incorporated in the regression analysis. As shown in Appendix B, a new variable was constructed to show what is called "effective Title I dollars" per pupil. This was computed by adding the Title I funds spent in 1965-66 and the fraction of Title I funds for 1966-67 spent up to the time of the 1966-67 achievement tests and dividing the sum by total number of pupils in Title I schools in each district. This new variable was included as one of the determining variables in regression and analysis of covariance.

Differences in test dates between 1965-66 and 1966-67 required use of different norm tables for pre and post tests or adjustments within a particular norm table. The occasions on which test dates in the two years differed by three or more weeks are shown in Appendix E, Table 54. The corrections required for these differences are shown in Appendix E, Table 59. The data presented in Appendix A have been corrected for differences in test dates.

Specific Grades/Students Exposed to Title I Programs

Relatively few school systems keep records on the amount and type of CE programs at specific schools. This means that it was often not possible to identify precisely which grades in a school

Table 4. Grade levels tested (1965-66 and 1966-67) with various achievement tests and subtests in eleven sample school districts.

School District	Stanford Achievement Tests: Paragraph Meaning	Metropolitan Achievement Tests: Reading	Iowa Tests of Basic Skills		Iowa Tests of Educ. Devel.		Sequential Tests of Educ. Progress: Reading
			Reading	Composite	Ability to Interpret literary materials	Composite	
1	4, 5, 6, 7, 8						
2	2, 3, 4, 5, 6						
3				4, 6, 8		10, 12	
4			4, 6, 8				10, 12
5	6	4					
6	3, 6						
8		2, 3, 4, 5, 6, 7, 8, 11					
10		3, 4, 5					
12		3					
13	1, 2, 6[a], 8				11		5
14		3, 4, 6, 8					

NOTE:

[a] Instances in which different editions of the test were used in years 1965-66 and 1966-67.

Table 5. Sample of schools analyzed in Phase I.[a]

School District	Number of Schools for Grade												Total Grades	Total Schools
	1	2	3	4	5	6	7	8	9	10	11	12		
1				10	17	4	4	4					39	21
2		10	12	12	12	10							56	12
3				15		15		5		1	1	1	38	21
4				11		11		5					27	16
5				14		14							28	14
6			2			2							4	2
8		9	9	9	9	9	3	4			3		55	16
10			9	2	2								13	9
12			4										4	4
13	7	7			7	7		2			2		32	11
14			6	6		6							18	6
TOTAL	7	26	42	79	47	78	7	20	0	1	6	1	314	132

NOTE:
[a] This does not include data on all schools listed in Table 3.

received Title I programs. Furthermore, it was not possible to identify the specific students in a grade who received CE from Title I programs. Consequently, it was decided to use test scores for an entire grade and to use all grades in Title I designated schools for which test data were available for both 1965-66 and 1966-67.

It was also decided to limit the sample to grades 1-12 in public schools. The sample of schools by grade and district which were analyzed is shown in Table 5.

Form of Data

Data received from school districts were in the following forms: class listings of individual pupils, punched cards of individual pupils, computer tab runs by individuals, and computer printouts of frequency distributions. Test scores included one or more of the following: raw scores, standard scores (for specific type of test), grade (or grade equivalent) scores, percentile scores, and stanines.

All scores not in national percentile were converted to national percentiles by using the appropriate conversion table provided by each test publisher for each separate form of test. Percentile scores were then converted to Standard T-scores. The distribution of Standard T-scores in the population is assumed to be normal with a mean of 50 and a standard deviation of 10. This assumption was utilized in converting national percentiles to Standard T-scores.* Details on the form of data obtained from certain school districts are given in Appendix D and an example of the detailed procedures for converting scores from one particular test is given in Appendix F.

Test results for each grade in each school for 1965-66 and 1966-67 have been summarized in terms of the nineteen statistics (see lower part of example of computer output in Figure 7). The central part of Figure 7, illustrates the conversion from raw scores to Standard T-scores. The summary statistics are all in terms of T-scores. The examples show 84 pupils in a grade; in the overall sample, the number of pupils in a grade ranged from 16 to 598.

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*This is consistent with reasoning by the Office of Education presented in Reference 8.

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GRADE 6, POST YEAR SCHOOL XXX
DATA IN RAW SCORES TO RUN THRU TIME-SHARING COMPUTER STATISTICAL PROGRAM

 41, 46, 60, 105, 41, 46, 60, 88, 41, 46, 59, 85, 85, 59, 46, 41, 46, 41, 57, 85
 39, 46, 57, 83, 80, 56, 46, 39, 38, 44, 76, 54, 71, 54, 44, 36, 33, 52, 44, 67,
 32, 33, 44, 51, 66, 64, 49, 42, 30, 30, 33, 42, 42, 49, 47, 49, 47, 64, 62, 62
 51, 51, 36, 39, 47, 47, 46, 41, 33, 30, 42, 30, 62, 62, 54, 30, 32, 36, 30, 38,
 49, 52, 30, 57


RAW SCORES RANKED IN ASCENDING ORDER:

 30      30      30      30      30      30      30      32      32      33      33
 33      33      36      36      36      38      38      39      39      39      41
 41      41      41      41      41      42      42      42      42      44      44
 44      44      46      46      46      46      46      46      46      46      47
 47      47      47      49      49      49      49      51      51      51      52
 52      54      54      54      56      57      57      57      59      59      60
 60      62      62      62      62      64      64      66      67      71      76
 80      83      85      85      85      88      105

RAW SCORES CONVERTED TO STANDARD T-SCORES AND RANKED:

 26.7        26.7        26.7        26.7        26.7        26.7        26.7        29.5
 29.5        31.2        31.2        31.2        31.2        32.5        32.5        32.5
 34.5        34.5        34.5        34.5        34.5        36.1        36.1        36.1
 36.1        36.1        36.1        36.6        36.6        36.6        36.6        37.7
 37.7        37.7        37.7        38.3        38.3        38.3        38.3        38.3
 38.3        38.3        38.3        39.2        39.2        39.2        39.2        40.8
 40.8        40.8        40.8        41.9        41.9        41.9        42.3        42.3
 43.6        43.6        43.6        44.2        44.7        44.7        44.7        45.4
 45.4        46.4        46.4        47.5        47.5        47.5        47.5        48.1
 48.1        50.1        50.5        52.1        54.4        56.4        57.7        58.8
 58.8        58.8        59.5        64.8

SUMMARY STATISTICS IN STANDARD T-SCORES:

SMALLEST VARIATE= 26.7         NUMBER OF VARIATES= 84
    LOWER DECILE= 29.5            ARITHMETIC MEAN= 40.381
  FIRST QUARTILE= 34.9         STANDARD DEVIATION= 8.52709
          MEDIAN= 38.3                   VARIANCE= 72.7113
  THIRD QUARTILE= 45.225       COEFF OF VAR [PCT]= 21.117
    UPPER DECILE= 53.25          STANDARD SKEWNESS= .623
 LARGEST VARIATE= 64.8             STANDARD EXCESS= .181
     TOTAL RANGE= 38.1
    DECILE RANGE= 23.75
SEMI-QUART RANGE= 5.1625
BOWLEYS SKEWNESS= .341
PEARSON SKEWNESS= .732
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Figure 7. Example of data processing and summary of statistics on each grade for 1965-66 and 1966-67.

Volume of Data

It was desired that the study include a wide variety of student and environmental characteristics. This required that a wide variety of school and program conditions had to be included, and that the overall sample had to be large so that there would be a sufficient number of observations within each type of condition to draw firm conclusions. Also, since school personnel suggested that only a small amount of change in achievement could be expected so soon after the initiation of Title I programs, our sample would have to be correspondingly large to detect any differences.

The amount of achievement test data used in the statistical analysis is shown in Table 5. The statistics shown in Figure 7 are available for each of the 314 grades shown in Table 5 for both pre and post years.

There is great variation in the amount of data collected from the various school districts. This variation resulted from differences in size of school district, variety in CE programs among schools and grade levels and difficulty in obtaining information.

There are fewer secondary than elementary schools. In large part, this is a natural consequence of the larger enrollment of secondary schools. It means, of course, that more students are represented by sample units at the secondary level.

The more relevant summary statistics along with pertinent district, school and grade characteristics for each of 314 observations in the sample have been retained in punched cards (see complete listing of data in Appendix A). A list and description of variables analyzed in Phase I are given in Appendix B.

RESULTS OF STATISTICAL ANALYSIS

The summary tables and discussions will be presented in sections corresponding to the objectives stated on page 1. To focus attention on the study objectives most of the technical discussion on statistical analysis has been put in appendices. The most relevant mathematics and assumptions underlying the various statistical analyses are presented in the main text but more complete details are in appendices. Also, the basic data on each of the 314 observations appear in Appendix A.

General observations that have been developed from the overall project but not necessarily from the statistical analysis are presented in the first part of Section 4.

Results from many of the statistical analyses are not reported here because they were not statistically significant. Because of the great volume of data it seemed best to describe each analysis that was carried out, but include in tables only those results which proved to be significant. The attempt to judge whether the observed change in each of the 314 grades was significant produced inconclusive results. First, the only measure of standard error was the observed variation among scores within the pre year and within the post year but this is known to be a biased underestimate of the variance of the observed change between pre and post years.* Second, even with the biased underestimate of the variance of the change in achievement the percentage of the 314 observations that would be judged as significant was approximately what would be expected by chance. Therefore, the tables and discussion in the remainder of Section 2 are based on average changes or frequency of positive changes in various groups (a group could be total sample, a specific school district, a specific grade, etc.).

The results using change in attendance as a performance measure show no significant improvement between 1965-66 and 1966-67. The mean change for the entire sample was + 0.12 percent but the standard error of this estimate is 1.60 which means that the estimate is not significant at the 50 percent level. Some of the individual districts showed a larger change but there are other explanations for the change. For example, the severe weather in New Orleans reduced the attendance in 1965-66 and it was natural to expect a positive change as large as the 2.8 percent that was observed. Because of the statistically insignificant results for change in attendance, most of the discussion of change in performance in the remainder of this section is in terms of change in academic achievement.

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*Analyses of sample data indicates that the variance of the difference between pre and post means is at least twice as large as the sum of the estimated variances of the pre and post means. This means that the information for one grade (i.e., one pre year and one post year) is not sufficient for judging statistical significance.

Has Statistically Significant Enhancement of Pupil Performance Resulted to Date from CE Programs?

This question will be addressed in terms of the overall sample and in terms of the sample of schools within each of eleven school districts. The term "enhancement," as used here, is the difference between achievement level after exposure to CE programs and the achievement level which would have been expected in the absence of such programs. Enhancement cannot be measured directly from available data. It is possible to measure the achievement level of pupils who received CE but the achievement level of the same pupils in the absence of CE can only be estimated. Therefore, conclusions on degree of enhancement of specific pupils must be developed by inference.

The results of most statistical tests presented below were based on observed differences in achievement scores between 1965-66 and 1966-67 rather than estimated differences between achievement with and without exposure to CE. That is, no adjustment was made for a possible negative trend; this means that observed differences between the two years understate differences between achievement with and without CE.

OVERALL SAMPLE. There is no indication of general improvement in the entire student population in the 314 grade observations. There is, however, indication that the achievement of students in the lower part of the distribution in their respective grades was slightly enhanced between 1965-66 and 1966-67. Table 6 shows both the weighted and unweighted average change at the first decile as significant at the 20 percent level. As described in the Section on technical approach (see page 8), the weighted average is essentially an average of all pupils whereas the unweighted average is an average of one statistic for each of the 314 grades.

Although data on the application of CE to various levels in the achievement distribution are not available it is reasonable to expect that CE and, especially, remedial programs were usually oriented towards those students whom are the most seriously disadvantaged and, therefore, have the lowest achievement scores. This means that we should expect more favorable results at the first decile. The change at the first decile is 0.25 Standard T-Score units. This is not easily interpreted in terms of grade equivalence because it represents the average change in many different grade levels. We know however that it is in the neighborhood of one-fourth month and is, therefore, quite small in importance. If, however, this small

Table 6. Average change in reading achievement test scores for the total sample.[a]

Achievement Test Statistic	Unweighted Observations[b]			Each Observation Weighted by Sample Size[b]		
	Average Change	Standard Error	Sig. Level[c]	Average Change	Standard Error	Sig. Level[c]
Mean ($\overline{X}$)	- 0.29	0.13	0.05	- 0.40	0.11	0.001
Lowest Decile (D_1)	+0.25	0.18	0.20	+0.21	0.16	0.20
Lowest Quartile (Q_1)	- 0.30	0.16	0.10	- 0.42	0.14	0.01
Upper Quartile (Q_3)	- 0.48	0.17	0.01	- 0.69	0.15	0.001

Notes:

[a] In units of Standard T-scores and based on observed changes in 314 school-grades in 11 districts.

[b] The unweighted average is computed as $\sum_{i=1}^{314} \frac{1}{314} X_i$ and the weighted average is computed as $\sum_{i=1}^{314} m_i X_i \div \sum_{i=1}^{314} m_i$ where m_i is the average number of pupils who took the pre and post test and X_i is the observed change in the specified statistic. Appendix C discusses the computational procedure for the estimated standard error.

[c] This is the probability that the observed sample result could have happened by chance if the true change between 1965-66 and 1966-67 was indeed zero.

positive value indicates a reversal of a negative trend it is of considerable importance. In judging the relevance of the 20 percent significance level for the unweighted decile it is important to keep in mind that although it is not highly significant it surely does not support the hypothesis that there was no change.

Table 6 also indicates a decrease in achievement in all but the lowest decile between 1965-66 and 1966-67. These results support a second important conclusion namely that even with CE programs present there is a negative trend in achievement level in schools towards which CE is oriented, reflecting the sociological and economic changes that are taking place in the student population.

The positive change in the decile, while not very large, becomes more significant when contrasted with the negative change in $\Delta\overline{X}$, ΔQ_1, and ΔQ_3. The four statistics used ($\Delta\overline{X}$, ΔD_1, ΔQ_1, ΔQ_3)* are not independent as indicated by the correlation coefficients shown later in Table 12. Also, except for the effects of CE one expects all four statistics to move in the same direction since they all come from the same distribution. One can then ask the question, how unusual is it to obtain the deviations actually observed if in fact there were no differences between the true means of ΔD_1 and $\Delta\overline{X}$? The answer to this question is that the observed differences between ΔD_1 and $\Delta\overline{X}$ would be highly unlikely by chance alone (less than 0.001 probability).†

Thus, although the absolute change in the first decile (+0.25) was not highly significant, the difference between the positive change in the decile and the negative change in the mean was significant at the 0.001 level. Hence, this is an indication of a positive effect of CE programs if one assumes that CE programs are usually concentrated on the lowest achievers in each grade.

The contrast between changes in the mean and changes at the first decile can be studied further by analyzing the frequency data in Tables 7 and 8. For example, there are more positive than negative changes

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*Δ indicates change in the statistic from 1965-66 to 1966-67 (post year minus pre year); $\overline{X}$, D_1, Q_1, Q_3, refer respectively to achievement at the mean, first decile, first quartile, and third quartile.

†Determined by testing for differences between correlated means using the correlations found in Table 12.

Table 7. Frequency of changes in achievement test scores in the mean and at the first decile.

District	Total Grades in Sample	Mean			First Decile		
		Increases	Decreases	No Change	Increases	Decreases	No Change
All Districts	314	145	163	6	126	103	85
1	39	23	15	1	9	10	20
2	56	18	38	0	24	20	12
3	38	19	19	0	20	15	3
4	27	8	18	1	10	13	4
5	28	11	16	1	7	10	11
6	4	3	1	0	3	1	0
8	55	25	29	1	16	11	28
10	13	6	7	0	7	5	1
12	4	3	1	0	3	1	0
13	32	21	10	1	17	11	4
14	18	8	9	1	10	6	2

Table 8. Contrasts between changes in the mean and at the first decile by district.[a]

District	Observations with Change in Means more favorable	Observations with Change in Decile more favorable	TOTAL	Sig. Level[b]
1	22.5	16.5	39	0.40
2	14	42	56	0.001
3	16	22	38	0.40
4	11	16	27	0.40
5	15.5	12.5	28	[c]
6	0	4	4	0.005
8	20	35	55	0.05
10	7	6	13	[c]
12	1	3	4	0.40
13	14	18	32	0.50
14	8	10	18	[c]
TOTAL	129.	185.	314.	0.01

NOTES:

[a] Differences among districts in ratio of "observations favorable to the decile to total observations" was not significant at the 5 percent level ($x^2 = 17.56 < x^2_{0.05(10)} = 18.3$).

[b] The x^2 test was used to determine if the function of observations favorable to the decile in each district was significantly different from one-half.

[c] Greater than 0.50 percent.

at the first decile but the reverse is true for the mean. The number of observations for which the change was measured as zero is important in evaluating the precision of the measuring instruments. Eighty-five or 27 percent of the 314 observations showed no change in the first decile while only 2 percent showed no change in the mean. The test scores are less precise in measuring low achievers within each grade and the publishers' conversion tables for computing national percentile are also less precise at low achievement levels within each grade. This lower precision at the first decile is possibly one of the reasons why the average change for the entire sample is not highly significant.

The tendency for the decile to increase relative to the other parameters can be examined by counting the number of observations for which the decile showed a more favorable change than the mean. As shown in Table 8 there were considerably more observations favoring the decile than the mean. Based on 314 observations, the difference in proportions is significant at the 1 percent level. The districts which show this contrast between changes in the decile and mean most clearly and strongly are 2, 6, and 8, for each of which the disproportion between changes in the mean and decile is statistically significant.

This study did not include analysis of the nature of the CE program in each of the 11 districts. Therefore, no full description of the programs in districts 2, 6, and 8 is available to help explain the emphasis at the lower end of the achievement distribution. It might be noted, however, that the amount of Title * funds per pupil expended by the time the post test date tends to be relatively low in two of the three districts (see Table 11).

INDIVIDUAL SCHOOL DISTRICTS AND VARIATION AMONG DISTRICTS. The average change in the mean and at first decile for each district is shown in Table 9. Some of the statistically significant changes are positive and some are negative.

Due to the large variation in results among observations within a school district only three individual districts show a significant change in the mean and only one district shows a significant change at the first decile. The lesser number of observations in each individual district makes the test for statistical significance less powerful than the corresponding test for the entire sample. The expected large variation within and among districts is one of the reasons why this study was designed to include a large sample and to include observations from several different school districts.

School District 13 shows significant positive changes in the mean and at the first decile. This district is analyzed in greater detail in Section 3. District 6 shows a greater positive change than District 13 but there are only 4 observations in District 6 and the results are not statistically significant. There is no obvious explanation of the large negative changes in Districts 2 and 4.

Comparing the weighted and unweighted averages in Table 9 one can see that weighting by sample size produced more favorable results in some districts and less favorable results in other districts.

Table 9. Changes in mean and lowest decile achievement test scores by school district.

	School District										
	1	2	3	4	5	6	8	10	12	13	14
Number of Grades Observed	39	56	42	27	28	4	55	13	4	32	18
A. Unweighted Observations											
Average Change in Mean	0.25	- 1.35	- 0.34	- 1.03	- 0.16	1.28	- 0.37	- 0.21	0.42	1.16	0.01
Standard Error	0.31	0.38	0.39	0.27	0.27	0.97	0.27	0.83	0.97	0.46	0.34
Sig. Level[a]	0.50	0.01	0.40	0.01	b	0.30	0.20	b	b	0.05	b
Average Change in Lowest Decile	0.05	0.04	0.22	- 0.68	- 0.70	4.20	0.26	0.55	1.78	1.32	0.95
Standard Error	0.32	0.48	0.58	0.72	0.50	1.82	0.37	1.00	2.02	0.69	0.64
Sig. Level[a]	b	b	b	0.40	0.20	0.10	0.50	b	0.50	0.05	0.20
B. Observations Weighted by No. of Pupils in Grade											
Average Change in Mean	- 0.07	- 1.19	- 0.21	- 0.92	- 0.25	1.58	- 0.65	- 0.07	1.01	0.69	0.04
Standard Error	0.26	0.37	0.30	0.24	0.24	0.85	0.23	0.70	0.86	0.41	0.36
Sig. Level[a]	b	0.01	0.50	0.01	0.30	0.20	0.01	b	0.30	0.10	b
Average Change in Lowest Decile	- 0.41	0.13	0.21	- 0.19	- 0.76	5.23	0.36	0.45	3.17	0.97	0.88
Standard Error	0.32	0.47	0.45	0.58	0.46	1.81	0.30	0.85	1.77	0.53	0.67
Sig. Level[a]	0.30	b	b	b	0.20	0.05	0.30	b	0.20	0.10	0.30

NOTES:

[a] The probability of observing an average change as large or larger than the one shown in the preceding row when the time change is zero is equal to the probability shown in this row.

[b] Greater than 0.50 percent.

The significance level of the positive changes in District 13 is less for the weighted than for the unweighted. On the other hand, the significance level for the positive changes in District 6 was greater for the weighted than for the unweighted. Except for testing a specific hypothesis TEMPO suggests that the weighted and unweighted averages be viewed as supporting the same general conclusions on effectiveness of CE.

Tests of significance using analysis of variance were performed to determine if there were significant differences in observed changes in achievement test scores among school districts. These analyses showed that differences in changes in mean achievement were significant at the 1 percent level (see Table 40). However, differences measured in terms of changes in achievement test scores at the first decile and first quartile were not statistically significant.

Analysis of covariance was used as a more discriminating test for detecting significant differences among districts. In this technique analysis of variance is performed after an adjustment is made for differences caused by variation in specific state variables. There is considerable variation in state variables among districts (see Table 11) which could cause changes in achievement. In other words, significant difference regardless of the cause or conditions is tested by analysis of variance, while significant differences from causes other than the specified covariates is tested by analysis of covariance (see discussion in Appendix C).

The analysis of covariance was extended to include a test for significant differences among schools within District 13. The results have important bearing on whether the effort in Phase II should concentrate on obtaining information at the school or grade level.

The basic model for analysis of covariance was

$$Y = T_i + a_1 (\$) + a_2 (L) + a_3 (A) + a_4 (\%N) + \epsilon \ , \qquad (1)$$

where

Y = measure of change in achievement ($\Delta \overline{X}$, ΔD_1, or ΔQ_1)

T_i = the variation in changes in achievement level that is attributable to the ith group

\$ = average Title I CE program funds per student (for all students in Title I schools in the school district) expended by the post test date,

L = mean achievement level at the beginning of Title I programs,

A = attendance rate in a school (1965-66)

%N = percent of pupils who were Negro (1965-66)

ϵ = an error component in the postulated relation.

There were seven districts and therefore seven groups in the analysis of covariance for testing significant differences among districts. There were eleven schools and therefore eleven groups in the analysis for testing significant differences among schools within District 13. The variable for Title I \$ was dropped from model in the analysis of District 13 schools because Title I expenditures were not available at the school level.

The results from analysis of covariance are shown in Table 10. The major conclusions are:

1. The variation in changes in the mean among districts are significant at the 1 percent level. As in the analysis of variance, the differences as measured at the first decile are not significant at the 5 percent level. It must be realized that sampling variation at the first decile and first quartile are larger than at the mean and therefore the F test based on these measures is not as sensitive as the test based on the mean.
2. The analysis of District 13 schools shows no significant differences among schools. This means that changes in test scores between 1965-66 and 1966-67 are not associated with specific schools and, therefore, variation in results cannot be attributed to differences among schools.

The analysis of covariance for testing significant differences among schools within a district was limited to a test based on change in the lower quartile for schools in District 13. There seems little need to extend these analyses since other data also indicate no significant differences among schools.

Detailed results for analysis of covariance are presented in Appendix C. The coefficients of the covariates presented in the detailed tables are analogous to regression coefficients. They provide another

Table 10. Results from analysis of covariance.

Differences Among Seven School Districts[a]	No. of Grade Observations	F Statistics for Null Hypothesis[b]
1. Change in mean achievement scores	240	F = 3.85 > F (1%) = 2.90
2. Change in lower decile achievement scores	240	F = 1.71 < F (5%) = 2.14
3. Change in lower quartile achievement scores	240	F = 2.60 > F (5%) = 2.14
Differences among 11 schools in District 13		
1. Change in lower quartile achievement scores	32	F = 1.42 < F (5%) = 2.38

NOTES:

[a] Only school districts 1, 2, 4, 8, 10, 13, and 14 for which data on the state variables used were available were included in this analysis. Data used in analysis of covariance did not include the adjustments indicated in Table 59. These adjustments are small and would not likely change the results in this table if they were used.

[b] The first value of F is computed from sample data and the second F value is from Snedecor's F table with degrees of freedom 6 and 230 for the first three tests and 10 and 19 for the fourth test.

measure of the influence of specified variables on achievement results. The results from analysis of covariance support the observations from regression analysis that the mean achievement level at the beginning of Title I programs is negatively correlated with change in achievement.

The basic unit of measurement of achievement in Phase I is the grade within a specific school. The only lower level of aggregation that could be used is the individual student. Results indicate that major differences in changes of achievement are among grades within a school and not among schools. If the several grades within a school are grouped together, possible sources of differences in relations between CE and enhanced achievement may be hidden by the averaging process.

Further insight into variation in observed changes in achievement can be obtained from examination of Figure 8. This shows the change in achievement test scores, at the first decile and mean respectively, for the grades and schools that comprise the District 13 sample. For example, in school "1" the mean achievement score in the 6th grade in 1966-67 was 2 Standard T-scores higher than the corresponding 6th grade score in 1965-66. The score at the first decile in 1966-67

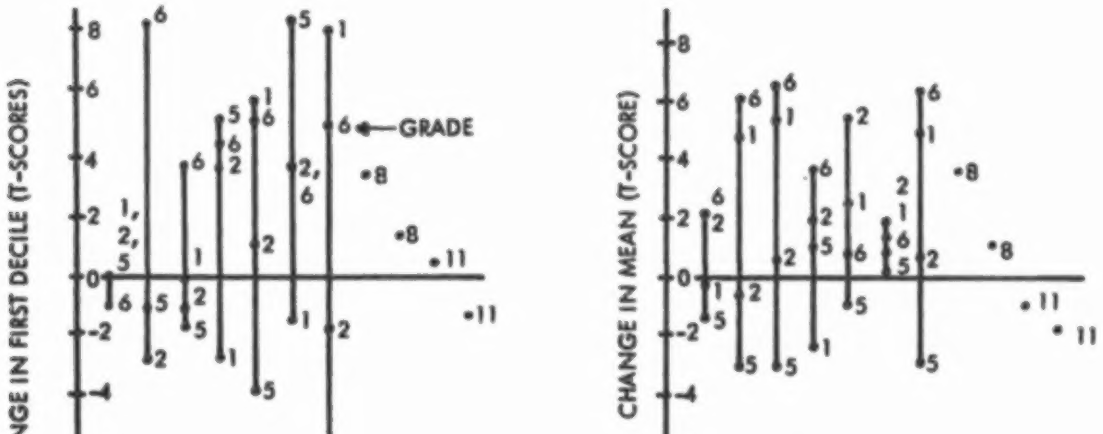

Figure 8. Changes in test scores in District 13 grouped by school.

was one standard T-score lower than the corresponding score in 1965-66. These results are representative of the variation within and among schools in most school districts. In almost every school there are both positive and negative changes spread over a substantial range of year-to-year variation. Similar situations exist for other districts for both the change in mean and change at the first decile. This could be caused by sampling variation or it could be caused by differences in type and amount of CE.

What school, pupil, and environmental characteristics are associated with enhanced pupil performance?

The first part of this section presents a brief summary of the different analyses and presents tables of estimated regression coefficients and simple correlation coefficients. The next part discusses the statistical results relevant to each of several state variables. The last part of the section presents general conclusions concerning the relationship among state variables and changes in achievement.

The following four types of analyses were carried out in an attempt to identify the relationships between state variables and changes in achievement:

a. Simple correlations between changes in achievement and state variables were computed from the combined data on all districts.

b. Simple correlations between changes in achievement and state variables were computed from data on each of the 11 districts.

c. Analysis of variance was computed for $\Delta \overline{X}$, ΔD_1, and ΔQ_1, using all 314 observations. The total group was partitioned according to contrasting levels of state variables to estimate the effects of these factors, as reflected by the three measures.

d. Multiple regression analyses were done using a number of state variables for which data were available.

The results from each of the above analyses are addressed in the discussion on each of the state variables in the sub-sections below. That is, conclusions on the relationships between each state variable and changes in achievement are based on statistical results from each of the above analyses.

Table 11 presents a summary of selected state and allocation variables by district. The simple correlation coefficients presented in Tables 12 and 13 show the degree of association between two variables. These coefficients were computed under the assumption that any relationship between two variables that might exist is linear. For example, the coefficient of - 0.10 between percent Negro and change in the mean (see Table 12) reflects only a small degree of association between these two variables. It is possible that the numerical value of the estimated coefficient is low because the relationship between the two variables is non-linear. It is also possible that it is low because other variables are correlated with both percent Negro and change in achievement.

Correlation coefficients computed from the combined data for all districts are shown in Table 12. Similar correlation coefficients were computed from data within each of the 11 school districts. Only one of these latter sets is presented in tabular form, namely, those for District 13 in Table 13. The correlations from the other 10 districts have been extracted and used to illustrate discussion of specific variables below.

Analysis of variance is helpful in identifying variables that are associated with changes in achievement in that it can be used for detecting significant differences among specified sets of results. It was used, for example, to determine if the change in achievement for schools with high percent Negro were significantly different from changes in schools with low percent Negro (see Table 18). Analysis of variance does not require the assumption of a linear relationship among the two variables of interest. It is also applicable for testing for significant differences among groups that cannot be described in numerical terms. For example, it would not be meaningful to compute a correlation coefficient between change in achievement and district but it is possible to use analysis of variance for testing differences among districts (see Table 48). Thus, analysis of variance is applicable in situations where simple correlation coefficients are not applicable.

Multiple regression analysis is helpful for identifying the effect of each state variable on changes in achievement and it is helpful in reducing the sampling variation when testing for significant effect from CE. This technique is especially helpful when the variable of interest (change in achievement in this case) has been affected by many different variables. In the model described in Equation 2 (see page 43),

Table 11. Summary of selected state and allocation variables by district.

District	Mean Test Score 1965-66[a]	Total Title I Funds ($ million)		Title I $ per Pupil 1965-67[b]	Effective Title I $ per Pupil[c]	Mobility (percent[a])	Percent Negro 1965-66[a]	Percent Spanish 1965-66[a]	Mean Grade ADM[a]
		1965-66	1966-67						
1	38.2	2.6	1.5	67	62	48	61	d	150
2	44.4	3.5	3.3	32	21	51	64	12	124
3	45.7	0.7	0.8	94	51	d	d	d	115
4	42.7	12.0	10.2	100	64	49	58	6	51
5	42.0	1.9	1.6	69	64	d	60	0	80
6	43.2	1.2	1.2	158	140	16	44	0	60
8	44.0	1.2	1.2	56	53	42	51	0	152
10	35.1	3.6	4.1	113	60	37	92	1	78
12	43.5	0.2	0.7	300	105	19	75	0	77
13	41.0	2.6	2.2	172	137	60	46	20	129
14	40.7	1.5	1.3	87	55	33	56	0	80
All Districts	42.4	31.0	28.1	82	75	47	56	7	120

NOTES:

[a] Average across all observations in each district. Mobility is computed as number of pupils moving into plus number moving out of a school, expressed as a percent of school ADM.

[b] Dollars per pupil computed by summing total Title I funds for both years and dividing by district ADM in Title I schools.

[c] Dollars per pupil computed as the sum of the average 1965-66 Title I dollars per pupil plus the fraction of the average 1966-67 Title I dollars per pupil corresponding to when the post year test was administered.

[d] Data not available.

Table 12. Correlations between selected variables, computed from combined data on all districts.[a]

Variable	District												
	1	2	3	4	5	6	7	8	9	10	11	12	13
1 Change in Mean	1.0	0.64	0.77	0.85	-0.43	0.03	0.05	0.02	-0.10	-0.08	0.23	0.16	0.30
2 Change in 1st Decile		1.0	0.59	0.39	-0.19	0.00	0.08	0.09	-0.07	-0.05	0.03	0.00	0.13
3 Change in 1st Quartile			1.0	0.50	-0.32	0.01	0.03	0.03	-0.14	-0.06	0.10	0.09	0.19
4 Change in 3rd Quartile				1.0	-0.35	0.04	0.07	-0.05	-0.10	-0.08	0.28	0.20	0.31
5 Mean Pre Achievement Score					1.0	-0.14	0.35	-0.15	-0.30	0.00	-0.17	-0.09	-0.23
6 Index of Mobility						1.0	0.01	-0.15	-0.47	-0.05	0.03	-0.10	0.03
7 Grade Attendance Rate (1965-66)							1.0	-0.30	-0.16	0.06	0.14	0.17	0.25
8 Change in Attendance Rate								1.0	0.22	-0.06	-0.22	-0.20	-0.07
9 Percent Negro (1965-66)									1.0	0.00	-0.13	-0.14	0.13
10 Change in Percent Negro										1.0	0.06	0.05	0.03
11 Pre Test Date											1.0	0.95	0.39
12 Post Test Date												1.0	0.34
13 Title I $ Per Student													1.0

NOTE:

[a] With 314 observations an absolute value of 0.15 for the correlation coefficient is significant at the 1 percent level and 0.11 is significant at the 5 percent level. With 240 observations the corresponding values are 0.16 and 0.12. Correlations with variables 7, 8, 9, and 10 were computed from 240 observations in the 7 districts for which data were available on these variables.

Table 13. Correlations between selected variables, computed from data for District 13.[a]

Variable	District												
	1	2	3	4	5	6	7	8	9	10	11	12	13
1 Change in Mean	1.0	0.66	0.72	0.92	-0.73	0.05	-0.19	0.03	0.09	-0.04	0.40	0.21	0.21
2 Change in 1st Decile		1.0	0.52	0.46	-0.43	0.09	-0.16	0.20	0.01	0.02	0.09	-0.03	-0.03
3 Change in 1st Quartile			1.0	0.53	-0.61	-0.01	-0.02	0.06	-0.17	-0.01	0.15	-0.01	-0.01
4 Change in 3rd Quartile				1.0	-0.70	0.12	-0.25	-0.05	0.21	-0.08	0.46	0.29	0.29
5 Average Achievement Level					1.0	0.08	0.27	0.05	-0.10	0.05	-0.57	-0.32	-0.32
6 Index of Mobility						1.0	-0.45	0.38	-0.20	0.05	0.26	0.20	0.20
7 Grade Attendance Rate							1.0	-0.27	-0.46	0.21	-0.18	-0.12	-0.12
8 Change in Attendance Rate								1.0	-0.13	0.19	0.06	0.04	0.04
9 Percent Negro									1.0	0.28	-0.04	-0.04	-0.04
10 Change in Percent Negro										1.0	-0.01	0.00	0.00
11 Pre Test Date											1.0	0.94	0.94
12 Post Test Date												1.0	1.0
13 $ per Student													1.0

NOTE:

[a] With 32 observations an absolute value of 0.44 for the correlation coefficient is signficant at the 1 percent level and an absolute value of 0.34 is significant at the 5 percent level.

there are five different variables that are postulated to be significant in explaining observed change in achievement.

The model for estimating regression equations using data from several school districts was

$$Y = a_0 + a_1 (\$) + a_2 (M) + a_3 (\%N) + a_4 (L) + a_5 (A) + \epsilon , \qquad (2)$$

where

Y = change in achievement level ($\Delta\overline{X}$ or ΔD_1)

$\$$ = average Title I CE program funds per student expended by the post test date for all students in Title I schools in the school district

L = achievement level at the beginning of Title I programs

M = mobility in and out of the school

$\%N$ = percent Negro in a school (1965-66)

A = attendance rate in a school (1965-66)

ϵ = an error component in the postulated relation.

Descriptions of the way each of these variables were measured are given in Appendix B. The regression equations were estimated without the corrections indicated in Table 59.

If the determining variables in the regression equation are independent each estimated regression coefficient is an estimate of the effect of a one unit change in the determining variable on the dependent variable. For example, an estimate of a_2 in the above equation would be an estimate of the effect of a one percent increase in mobility rate on change in achievement. A regression coefficient is more meaningful than a simple correlation because the latter often reflects spurious correlation caused by the fact that both variables are related to a third variable. Although the determining variables might not be independent, the regression coefficient for each variable is another measure of the relationship between that variable and the dependent variable.

The estimated regression coefficients using change in the mean as dependent variable are shown in Table 14. The estimated coefficients using change in achievement at the first decile are shown in

Table 14. Estimated regression coefficients relating change in mean achievement to selected variables.[a]

District	Constant Term	Mobility Rate[c]	Percent Negro[c]	Mean Achievement Score[c]	Attendance Rate[c]	CE Funding per Student (Title I)	R^2
Pool[b]	0.73	- 0.003 (0.006)	- 0.018 (0.004)	- 0.387 (0.039)	0.175 (0.048)	0.0027 (0.0040)	0.37
1	38.5	- 0.075 (0.021)	- 0.039 (0.009)	- 0.91 (0.136	0.027 (0.064)		0.60
2	- 3.21	- 0.003 (0.011)	- 0.034 (0.011)	- 0.628 (0.141)	- 0.343 (0.250)		0.30
3	- 39.0	d	0.028 (0.036)	- 0.142 (0.132)	0.482 (0.319)		0.09
4	24.0	e	0.004 (0.009)	- 0.306 (0.143)	- 0.136 (0.118)		0.39
5	8.11	d	- 0.003 (0.007)	- 0.193 (0.116)	d		0.10
6-12 combined	19.3	d	0.014 (0.002)	- 0.443 (0.271)	d		0.52
8	7.54	- 0.007 (0.016)	- 0.019 (0.009)	- 0.614 (0.102)	0.219 (0.118)		0.44
10	- 59.1	- 0.048 (0.022)	0.188 (0.050)	- 0.518 (0.091)	0.701 (0.182)		0.87
13	- 0.216	0.005 (0.026)	0.004 (0.015)	- 0.524 (0.094)	0.232 (0.771)		0.55
14	51.3	0.030 (0.065)	- 0.016 (0.018)	- 0.213 (0.128)	- 0.459 (0.504)		0.33

NOTES:

[a] Standard error values are shown in parentheses beneath the respective estimated regression coefficients.

[b] "Pool" means Districts 1, 2, 4, 8, 10, 13, and 14 taken together.

[c] Data are for 1965-66.

[d] Data not available.

[e] Not included in final regression equation because F value in the final test for significant reduction of residual variance was less than 0.005.

Table 15. The R^2 statistic in the last column is an estimate of the portion of the variation in the dependent variable that can be explained by the determining variables included in the equation.

Each of the variables that might have affected changes in achievement between 1965-66 and 1966-67 will be discussed in a separate sub-section. The results from each type of statistical analysis are not applicable to discussion on each variable and, therefore, are not referred to in each sub-section.

GRADE. There is reason to expect that grade level would be associated with benefit from compensatory education. There may be critical periods during which compensation for educational deprivation is relatively easy, and others when it is very difficult. Thus, it may be that if educationally deprived children are given remediation soon enough they may be able to overcome most if not all of their disadvantage. This concept is consistent with the opinion expressed in an earlier report on the first year of Title I (Reference 3, p 39).

In this study, the effect of grade level was examined by an analysis of variance. The analysis of variance showed no significant differences in average change among grade levels.

The simple correlations between changes in achievement and grade level are shown in Table 16. Although most of the correlations are negative, the results are not statistically significant.

The average achievement level in 1965-66 and the average for each measure of change in achievement between 1965-66 and 1966-67 are shown in Table 17. This table also shows the relationship between Standard T-score, national percentile, and grade equivalence.

For example, the average T-score for the 78 observations on grade 6 was 42.6. This average corresponds to the 23rd national percentile. A student obtaining a Standard T-score of 42.6 at the mid-point in the 6th grade would have a grade equivalence score of 5.3 compared to the national average of 6.5. A student with a score of 5.3 would be considered 1.2 years behind in achievement level.

The results in Table 17 show no apparent relationship between grade level and changes in achievement. They also show no apparent relationship between amount of educational deprivation and grade level.

Table 15. Estimated regression coefficients relating change in achievement at the first decile to selected variables.[a]

District	Constant Terms	Mobility Rate[c]	Percent Negro[c]	Mean Achievement Score[c]	Attendance Rate[c]	Effective CE Funding per Student (Title I)	R^2
Pool[b]	- 0.29	- 0.018 (0.010)	- 0.020 (0.007)	- 0.330 (0.061)	0.210 (0.074)	0.0063 (0.0063)	0.13
1	- 4.62	- 0.031 (0.028)	- 0.021 (0.012)	- 0.175 (0.186)	0.156 (0.087)		0.16
2	1.29	- 0.020 (0.019)	- 0.034 (0.015)	- 0.662 (0.189)	0.212 (0.334)		0.22
3	- 77.1	d	0.043 (0.052)	e	0.826 (0.465)		0.09
4	41.7	- 0.038 (0.050)	- 0.061 (0.032)	- 1.24 (0.466)	0.183 (0.430)		0.25
5	3.51	d	- 0.007 (0.013)	- 0.090 (0.226)	d		0.02
6, 12 combined	48.2	d	0.001 (0.005)	- 1.06 (0.607)	d		0.47
8	22.2	- 0.051 (0.025)	- 0.041 (0.014)	- 0.672 (0.158)	0.128 (0.183)		0.31
10	- 45.5	0.113 (0.055)	0.156 (0.123)	- 0.170 (0.225)	0.477 (0.447)		0.45
13	50.0	0.006 (0.052)	- 0.008 (0.030)	- 0.458 (0.187)	- 0.310 (1.54)		0.21
14	106	- 0.120 (0.106)	0.009 (0.030)	- 0.037 (0.209)	- 1.07 (0.823)		0.17

NOTES:

[a] Standard error values are shown in parentheses beneath the respective estimated regression coefficients.

[b] "Pool" means Districts 1, 2, 4, 8, 10, 13 and 14 taken together.

[c] Data are for 1965-66 only.

[d] Data not available.

[e] Not included in final regression equation because F value in the final test for significant reduction of residual variance was less than 0.005.

Table 16. Correlations between grade level and changes in achievement scores.[a]

District	Change of Achievement				
	$\Delta\bar{X}_1$	ΔD_1	ΔQ_1	ΔQ_3	Number of Grades
1	- 0.15	- 0.23	- 0.20	- 0.05	39
2	- 0.17	- 0.12	- 0.12	- 0.09	56
3	- 0.07	- 0.11	- 0.12	- 0.03	38
4	0.00	0.05	- 0.18	0.06	27
5	0.01	- 0.12	- 0.16	0.02	28
6	0.55	0.06	0.77	0.93	4
8	- 0.16	0.10	- 0.14	- 0.18	55
10	- 0.28	- 0.09	- 0.28	- 0.14	13
12	-	-	-	-	-
13	- 0.17	0.01	- 0.02	- 0.26	32
14	- 0.22	- 0.04	- 0.20	- 0.16	18
All Districts	- 0.13	- 0.08	- 0.14	- 0.08	314

NOTE:

[a] Correlations were computed under the assumption that the relation between change in achievement and grade (if any) is a linear relation between change in achievement and the familiar numerical identification of grades (i.e., grade 1, grade 2, etc.). Although some of the individual correlations are significant at the 5 percent level the percentage of the total that are significant is approximately what would be expected by chance alone.

Table 17. Summary of achievement level 1965-66 and changes in achievement between 1965-66 and 1966-67, by grade.

Grade	Average Achievement Level 1965-66			Average Change				No. of Observations
	Standard T-score	National Percentile	Grade Equiv.[a]	$\Delta\overline{X}$	ΔD_1	ΔQ_1	ΔQ_3	
1	39.1	14	1.3	+ 1.97	+ 2.27	+ 0.99	+ 3.01	7
2	44.0	28	2.2	- 0.33	- 0.22	+ 0.24	- 0.97	26
3	40.9	18	2.6	+ 0.16	+ 1.06	+ 0.08	- 0.34	42
4	42.7	23	3.5	+ 0.06	+ 0.53	+ 0.28	- 0.09	79
5	41.6	20	4.3	- 1.01	- 0.56	- 1.24	- 1.07	47
6	42.6	23	5.3	- 0.54	+ 0.05	- 0.75	- 0.60	78
7	40.7	18	5.8	- 0.66	- 0.04	- 0.20	- 1.26	7
8	42.8	25	7.0	- 0.40	+ 0.11	- 0.38	- 0.53	20
10	48.8	45	b	+ 0.50	0.0	0.0	0.0	1
11	46.2	35	b	- 1.23	- 0.18	- 1.40	- 1.42	6
12	51.2	55	b	+ 0.90	+ 1.30	0.0	+ 1.30	1

NOTES:

[a] Grade equivalence was computed from tables provided by the MAT and ITBS Tests and is based on mid-year evaluation. For example, the grade equivalence of 1.3 for the first grade is 0.2 below the 1.5 level which is the average for mid-year first grades in the nation.

[b] Publishers' conversion tables for computing grade equivalence were not available to the contractor.

The possible effect of grade level was studied in the regression analysis by relating the error component (i.e., ϵ in Equation 2) to grade level. This was done in an attempt to determine if the changes in achievement that could not be explained by the variables included in the regression equation could be explained by differences in grade level. There was no evidence that changes in achievement were related to grade level.

POVERTY. One of the criteria for inclusion in Title I is low income level of the pupils' families. Although allocation of Title I dollars to school districts was based on number of pupils from families with income below $2,000 the criterion of low income within a school district and, therefore, qualification of the school for Title I funds varies throughout the country. Our classification of poverty for each school was the criterion used by each of the respective school districts.

Schools in the sample were classified as high, medium or low poverty relative to all Title I schools in that district. In view of the purposes of Title I funds more money might be expected to be allocated to schools with the most poverty.

The analysis of variance and the simple correlations between poverty and changes in achievement do not show any reliable relationships between poverty level and changes in achievement test scores.

MOBILITY. High student mobility is a condition likely to dilute the effects of Title I. It is unlikely that students who transfer to another school will have the same type of CE program.

High mobility makes it difficult to relate Title I dollars with changes in achievement because many of the students taking what we have called the "post test" might have been exposed to very little of the CE programs in the school in which he is tested.

The results from sample data give inconclusive evidence on the effects of mobility. The regression coefficients for this variable are generally negative but only some of them are statistically significant (see Tables 14 and 15).

The analyses of variance showed no significant differences in changes in achievement between high and low mobility rates. The correlation coefficients in Tables 12 and 13 do not show a negative relationship. Since the regression and correlation coefficients have opposite signs there is reason to believe that mobility is directly related to other variables which have a positive effect on changes in achievement. For example, it is possible that more Title I dollars would be allocated to schools with high mobility because they are likely to have a high percentage of pupils from families with low income.

The effects of high mobility should be investigated further in Phase II. It will then be possible to use analysis of covariance which is a more powerful analytical tool than used thus far since it makes adjustments for covariates.

PERCENT NEGRO. The relationship in change in achievement to percent Negro was examined in light of the topical interest in Negro educational problems. The analysis below suggests a strong relationship between percent Negro enrollment and changes in achievement. Five levels of percent Negro were defined for analysis of variance: 0 to 19 percent, 20 to 39 percent, 40 to 59 percent, 60 to 79 percent, and 80 to 100 percent.

The results in Table 18 show that the 0 to 19 percent group responded best, while the 40 to 59 percent group responded the worst. The positive change for the 0 to 19 percent group is statistically significant at the 10 percent level. The negative change in the mean and first quartile for the 40 to 59 percent group are statistically significant at the five percent level.

The non-linear relationship between percent Negro and change in achievement indicated by the results in Table 18 explains why so many of the simple correlation coefficients shown in Table 19 are small. There does appear to be a significant linear relationship between percent Negro and absolute achievement level but not a significant linear relationship between percent Negro and change in achievement.

The effect of these levels on changes in achievement (as measured by ΔX, ΔD_1 and ΔQ_1) was studied in one-way analyses of variance using 277 observations and in a two-way analysis of variance using

Table 18. Average of changes in achievement scores, by percent Negro in school.

	Percent Negro in school				
	0-19	20-39	40-59	60-79	80-100
Number of Cases	56	34	45	35	108
Change in Mean:					
Mean change in $\Delta\overline{X}$	0.5	- 0.4	- 0.9	- 0.4	- 0.2
Standard error	0.29	0.45	0.41	0.36	0.21
Significance level[a]	0.10	0.40	0.05	0.30	0.40
Change in First Quartile:					
Mean change in ΔQ_1	0.9	- 0.02	- 1.4	- 0.5	- 0.3
Standard error ΔQ_1	0.40	0.50	0.39	0.46	0.24
Significance level[a]	0.05	b	0.01	0.30	0.30
Change in First Decile:					
Mean change in ΔD_1	1.1	- 0.1	- 0.3	- 0.0	0.4
Standard error ΔD_1	0.38	0.68	0.54	0.48	0.30
Significance level[a]	0.01	b	b	b	b

NOTES:

[a] Probability of obtaining a value as large or larger than the sample mean by chance if the expected change in achievement score between 1965-66 and 1966-67 were zero.

[b] Greater than 0.50 percent.

80 observations.* The analysis of variance results are shown in Table 20. The results using the first decile are not statistically significant but several of the results using the mean and first quartile are significant. The difference among the five groups are statistically significant. The difference between the 0 to 19 percent group and the 40 to 59 percent and between the 0 to 19 percent group and the 20 to 100 percent group are both statistically significant.

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* Ideally, it would be preferable to handle all of the factors simultaneously in a multiple factor analysis of variance. However, this was not feasible; there were numerous cells with missing data, and the resulting partial layout was not balanced.

Table 19. Correlations between percent Negro in a school and achievement scores.[a]

District	No. of Obs.	Initial Achievement Level	ΔMean	ΔD_1	ΔQ_1	ΔQ_3
1	39	-0.20	-0.20	-0.21	-0.20	-0.12
2	56	-0.46[b]	-0.17	-0.04	-0.25	-0.21
4	27	-0.23	0.00	-0.04	-0.19	0.06
5	28	0.05	-0.08	-0.11	0.04	0.20
6	4	-0.89[b]	0.76	0.60	0.45	0.07
8	55	-0.33[b]	-0.13	-0.11	0.07	-0.15
10	13	-0.38	0.47	0.34	0.41	0.35
12	4	-0.64	0.49	0.77	0.68	-0.55
13	32	-0.10	0.09	0.01	-0.17	0.21
14	18	-0.34	-0.14	-0.19	-0.55[b]	0.11

NOTES:

[a] Percent Negro for District 3 were not available for 1965-66.

[b] Significant to 5 percent level.

It is difficult to specify the precise cause as to why changes in achievement are related to percent Negro. However, the relationship is strong enough that the topic deserves further analysis when more data are available on the allocation of Title I funds for CE.

There is considerable variation among school districts in percent Negro students, therefore it might be thought that the above results reflect simply differences among districts. To control for the effects of district, a two-way analysis of variance was performed using only two levels of Negro composition and the eight districts which met

Table 20. Significance levels of differences in mean change among groups based on percent Negro.[a]

Contrasted Groups[b]	$\Delta\overline{X}$	ΔD_1	ΔQ_1
1. All 5 Groups	5%	25%	0.5%
2. Group I and Groups II-V (pooled)	10%	50%	5%
3. Group I and Group III	10%	50%	5%
4. Group I and Group II	50%	c	50%
5. Group III and Group V	c	c	
6. Groups I-II (pooled) and Groups III-V (pooled)	c	c	50%

Notes:

[a] Percent Negro in the pre-year was used for the grouping: Group I, 0 to 19 percent Negro; Group II, 20 to 39 percent Negro; Group III 40 to 59 percent Negro; Group IV, 60 to 79 percent Negro; Group V, 80 to 100 percent Negro.

[b] Based on the S-Method of multiple comparisons (see Reference 15).

[c] Greater than 50 percent.

the data requirements. Because we wished to test whether the observed difference among levels of percent Negro was maintained when district was controlled, only the categories of percent Negro which differed the most were compared. For each district having such data, the five observations with the lowest percent Negro were selected in each of the contrasting categories of 0 to 19 percent Negro and 40 to 59 percent Negro. In both changes in the mean and changes in the lower quartile the results are highly significant. That is, the two levels of percent Negro have significantly different means, reinforcing the earlier results. The non-significant results for the "interaction" effect indicate the relationship between achievement and percent Negro is similar within each of the eight districts.

Change in Percent Negro

Just as school racial composition correlates with achievement test score level (e.g., correlation of - 0.30 in Table 12), so changes in racial composition may be expected to correlate with changes in achievement level.

The correlations between change in percent Negro (post versus pre) and changes in achievement test level are shown in Table 21. Only a few of the correlations within particular districts are so large as to be statistically reliable and these do nor present a consistent picture. To look more intensively into the variable of change in racial composition, a second type of examination was done. There were 53 school-grade observations from 26 schools for which the change in percent Negro in the school was 5 percent or more. Of these, 41 increased in percent Negro and 12 decreased. The changes in mean and decile achievement test scores for these observations are shown in Table 22. Relatively large changes in percent Negro in either direction are associated with less favorable changes in achievement scores.

PERCENT SPANISH. There are several school districts which have a sizeable proportion of students of Spanish extraction. The analysis did not reveal any significant relationships between percent Spanish and changes in achievement. However, the analysis is not decisive. The statistical tests were based on a small sample and there was little variation in the percentages of pupils from Spanish speaking families within each of the school districts.

MEAN READING ACHIEVEMENT LEVEL AT THE BEGINNING OF TITLE I PROGRAMS. Compensatory education is aimed primarily at students who have suffered from cultural disadvantages and can, therefore, be expected to have relatively low achievement test scores. It might be expected that the emphasis of the CE programs (particularly remediation programs) would be toward students with lower achievement test scores rather than those with highest scores. Thus, the nature of the program would suggest that a negative correlation might exist between change in achievement level and original achievement level. It appears that this is the case. However, interpretation of the meaning of the correlation must be qualified by the realization that there is a built-in correlation due to statistical regression between original levels on a variable and changes in that variable from one time to another. That is, on any given measurement of a variable "errors of measurement" are reflected in extreme

Table 21. Correlations between change in percent Negro in a school and achievement scores.[a]

District	No. of Obs.	Initial Achievement Score	$\Delta\bar{X}$	ΔD_1	ΔQ_1	ΔQ_3
1	39	-0.34[b]	0.11	-0.03	0.13	0.04
2	56	0.30[b]	-0.05	0.01	-0.04	-0.01
4	27	0.34	-0.12	-0.02	0.23	-0.42[b]
5	28	-0.01	-0.31	-0.45[b]	-0.28	-0.20
6	4	0.89[b]	-0.76	-0.60	-0.45	-0.07
8	55	0.05	-0.07	-0.03	0.00	-0.16
10	13	0.17	-0.40	-0.22	-0.44	-0.20
12	4	-0.27	-0.03	0.13	0.20	-0.50
13	32	0.05	-0.04	0.02	-0.01	-0.08
14	18	-0.03	-0.05	-0.43	-0.38	0.06

Notes:

[a] Percent Negro for District 3 were not available for 1965-66.

[b] Statistically significant to the 5 percent level.

Table 22. Average change in achievement test scores, by type of change in racial composition.

Observations	N	Average Δ Mean	Average Δ Decile
Large increase (≥5%) in percent Negro	41	-0.8	-0.4
Little change in percent Negro	219	-0.2	+0.5
Large decrease (≥5%) in percent Negro	12	-0.6	-1.2
TOTAL	272	-0.34	+0.31

scores and a portion of these will "regress" toward the mean on later testing (Reference 14, pp 321-324). This phenomenon is mainly a problem in evaluating the correlation between $\Delta\overline{X}$ and the pre mean (i.e., the mean for 1965-66). Errors in measurements of D_1, Q_1 and Q_3 for 1965-66 would not likely be highly correlated within measurement of $\overline{X}$ in 1965-66 and, therefore, the spurious* correlation between changes in D_1, Q_1 and Q_3 and the pre mean is likely to be small.

The average initial reading achievement level was a highly significant variable in the regression analysis. The regression coefficients are negative in all twenty-two regression equations shown in Tables 14 and 15. This result is in line with the negative correlations shown in Tables 12 and 13. The regression coefficients on the pre mean ($\overline{X}$) in Table 15 are affected by the spurious correlation discussed above.* Regression coefficients and simple correlation coefficients both indicate that this variable is more highly correlated with changes in achievement at the first decile than any other state variable analyzed during Phase I (e.g., see row 2 in Tables 12 and 13).

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*It is not possible to develop a precise estimate of the effect of the spurious correlation from data that are available. A technical discussion of this problem is presented in the last part of Appendix C.

These results suggest that the relationship between initial reading level and expected changes from CE should be investigated further in Phase II. As with all statistical results, the researcher must be careful in drawing firm conclusions until he has analyzed possible reasons for spurious correlations.

MEAN ATTENDANCE RATE IN SCHOOL PRIOR TO CE. The school attendance rate in 1965-66 has a small positive correlation with $\Delta\bar{X}$, ΔD_1, ΔQ_1 and ΔQ_3 when computed from the combined data for all school districts (see Table 12). However, the same correlation computed from data within each of the school districts shows both negative and positive correlations (e.g., see correlation for District 13 in Table 13). The regression coefficients are generally positive but only a few are significantly different from zero.

A positive correlation between attendance rate and enhancement would suggest that it might be well to orient CE programs towards increasing attendance. The returns per dollar of Title I might be higher than if all money is oriented towards academic skills. However, the correlations observed in the Phase I analyses might be tested in follow-on work before drawing any firm conclusion concerning attendance and CE programs.

Change in Attendance Rate

Attendance is another type of pupil performance often regarded as a possible criterion for educational programs. It is assumed to vary with children's motivation to learn and to be a prerequisite to benefiting from school work.

To date within our study no control for other factors, such as weather or recording procedures which might affect attendance measures has been used. Further, districts differ fairly markedly in definitions of attendance. Therefore, the present measures should be regarded as fairly crude, especially for inter-district calculations.

The correlations between change in attendance figures between years 1965-66 and 1966-67 and change in achievement statistics during these same years are shown in Table 23. Most of the correlations appear low and only two are statistically reliable to the 5 percent level. There does not appear to be any clear relationship between change in attendance rate and change in achievement test scores.

Table 23. Correlations between change in attendance rate and changes in achievement scores.

Districts	$\Delta\bar{X}$	ΔD_1	ΔQ_1	ΔQ_3	Number
1	0.21	0.34[a]	0.04	0.17	39
2	0.05	0.06	-0.05	-0.01	56
3	-0.14	-0.26	-0.25	-0.06	38
4	0.06	-0.21	0.00	0.13	27
10	0.19	0.46	0.10	-0.01	13
13	0.03	0.20	0.06	-0.05	32
14	0.18	0.48[a]	0.21	0.19	18

Note:

[a] Statistically reliable to the 5 percent level.

SIZE OF GRADE AND SIZE OF SCHOOL. The statistical evidence shows no significant relation between changes in achievement and number of pupils in the grade or number of pupils in the school. There is little evidence to encourage further investigation of this variable in follow-on works.

SUMMARY OF ANALYSIS OF SPECIFIC STATE VARIABLES. This study presents statistical evidence to support a priori reasoning that certain environmental conditions have an important effect on the results of compensatory education. This suggests that CE programs should be designed in light of environmental conditions. Time in Phase I did not permit analysis of possible trends in achievement at inner-city schools. Analysis of specific environmental variables such as grade, poverty and mobility would be more meaningful if the trend factor could be studied at the same time.

In this sample statistically significant differences were associated with percent Negro and achievement level at the beginning of compensatory education. The analysis did not reveal any significant association between the other state variables and enhancement in achievement.

The differences in average changes between 1965-66 and 1966-67 in the various districts were statistically significant. It is not possible to say if these differences are due to trends, differences in pupil/school characteristics, or differences in CE programs.

The percentage of the variation in changes in achievement that can be explained by the variables included in the regression model is very small. The R^2 for the regression using change in the first decile as dependent variable and computed from data for seven districts is only 0.13 (see Table 15). That is, 0.14 is the best estimate of the percent of the variation in ΔD_1 that is explained by the five variables — mobility rate, percent Negro, initial achievement level, attendance rate, and "effective Title I dollars per student."

There are many state variables other than those studied here which may have a relationship to enhancement in achievement. Future effort in this area would do well to consider these additional variables such as changes in proportions of classes given achievement tests, the form of achievement tests used, and the percent of minority group pupils (combining Negro and Spanish-speaking) in a grade.

SECTION 3

PRELIMINARY ANALYSIS IN IDENTIFICATION OF DISTINGUISHING FEATURES OF SUCCESSFUL CE PROGRAMS

The first phase of this study focused on changes in achievement test scores between 1965-66 and 1966-67 and the relationship between these changes and selected pupil-school-environmental characteristics. The more detailed questions concerning distinguishing features of successful CE programs were deferred. However, it was possible to make two types of examinations of effects of CE programs preparatory to later analyses. One of these was the inclusion in the correlation and regression analyses of a variable indicating average Title I expenditures per pupil by district. The second examination involved case studies of specific CE activities at particular grades in two districts undertaken as prototype studies of estimating cost and analyzing results of CE programs. Results of the exercise suggest how relationships between CE programs and enhanced pupil performance must be examined.

DISTRICT LEVEL TITLE I EXPENDITURE PER PUPIL—11 DISTRICTS

To obtain at least a crude measure of the overall level of per pupil expenditure for CE, Title I expenditure figures for each district as a whole were used. For this level of expenditure to be appropriate to the achievement test results, the amount of the Title I expenditures in 1966-67 proportionate to the length of the academic year elapsing before the post test was assigned. The measure of Title I dollars per student was based on (1) total Title I dollars expended within the district for 1965-66 and 1966-67, and (2) total number of pupils in district schools receiving Title I funds. Effective Title I dollars per student for each sample observation was computed as the sum of average dollars per pupil in 1965-66 plus a portion of the average dollars per pupil in 1966-67. The portion used for 1966-67 was the fraction of the academic year that had elapsed up to the time of the 1966-67 test for each specific grade unit.

At the level of specific school districts there seems to be a congruence between changes in achievement test score and effective Title I dollars per pupil (see Table 24). The three districts with the highest level of Title I funding have the largest gains in achievement at the first decile.

The correlation coefficients in Table 12 reveal an apparent relationship between gain in achievement and effective Title I expenditures. The correlations between "effective Title I dollars" and each of the four measures of changes in achievement are significant at the 5 percent level.

These positive findings must be qualified, however, by three considerations. (1) The correlations for the lower quartile and lowest decile are lower than for the mean and upper quartile. (2) Observations within a district are not fully independent, since for a given grade level in a district all tests were administered at the same time, and the same amount of Title I expenditures will apply. Since it is known that changes in achievement scores differ significantly among districts, much of the observed relationship may be due simply to difference among districts.* (3) The regression coefficients for the mean and the lowest decile after correction for mobility rate, percent Negro, attendance rate and mean initial achievement level are small relative to their standard errors. This suggests that the apparent relationship between district level Title I expenditures and achievement change might be accounted for by other variables which are correlated with amount of Title I dollars.

Correlations between district level Title I expenditures and achievement changes within a district (e.g., see Table 13) have quite limited meaning because the only source of difference in amounts of Title I expenditures is difference in testing data among grades. It is not surprising that these correlations were not statistically significant.

In all, this crude attempt to determine the overall relation between level of Title I funding and achievement change produced evidence suggestive of a positive relationship; but this evidence is based on highly aggregated data and cannot be regarded as highly reliable. Analyses of more detailed data within particular districts are presented below.

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* For this reason it is hard to establish the degrees of freedom appropriate for testing the statistical significance of the correlations between achievement test changes and Title I funding.

Table 24. Average Title I funds per pupil and changes in achievement.

District[a]	Change in D_1	Change in $\overline{X}$	Effective Title I \$ per pupil
6	4.20	1.28	140
12	1.78	0.43	135
13	1.32	1.12	137
14	0.95	0.14	55
10	0.55	-0.21	60
8	0.26	-0.38	53
3	0.22	0.36	51
1	0.05	0.13	62
2	0.04	-1.35	20
4	-0.68	-1.03	64
5	-0.70	-1.16	64

Note:

[a] Districts arranged by order of magnitude on observed changes in D_1.

PURPOSE OF TWO CASE STUDIES IN ALLOCATION OF PROGRAM RESOURCES TO THE GRADE LEVEL

One of the main objectives of this study is to determine relationships between changes in pupil performance and characteristics of compensatory education (CE) programs, including resource expenditures and pupil exposures. In order to develop reliable estimates of the contribution of CE to enhanced achievement, it is necessary to measure or estimate resource expenditures at the same level at which pupil performance measurements (e.g., achievement and attendance) are made. Pupil performance measurements are available for grades, but CE program descriptions and financial data were found mostly at the district level. When these kinds of information are recorded at school and district levels of aggregation, the effects of CE upon pupils are obscured because of the small percentage of students receiving CE and because of the large variation in CE resources among grades within the schools. Therefore, it is necessary to estimate the distribution of program resources from school districts to schools and grades and to identify the several types of CE programs implemented for selected grades in sample schools.

Wide disparities exist among the sample school districts in the amount, degree of detail, and level of aggregation of data. It was obvious that substantial effort would be required to extract, summarize, standardize, and process the information, and assign values to the variables that will be utilized in the regression analyses to be performed during Phase II. Two of the sample school districts were selected to determine the feasibility of assigning CE resources to grades. This analysis should yield a better understanding of variations in types of CE programs, duration of exposure of pupils, and specific amounts of CE resources expended in these two districts. More importantly, the analysis should provide guidance as to the preferred method for assigning these resources to the grade level for all sample school districts during Phase II of this study.

Different approaches were tested in the two districts selected. These differences in method reflect substantial differences in the data obtained. One approach, used in District 10, employed the CE program information that is readily available at the district level and from this attempted to identify the type of programs authorized by school and grade and to distribute CE resources to schools and grades within the district based on these authorizations. The second approach, used in District 13, started at the grade level within a school and attempted to identify the specific programs that were implemented and to estimate the resource requirements to perform these activities.

Each approach required that reasonably complete data be already accumulated or that additional data be easily obtainable by phone or mail. A brief inventory was made of the principal types of data obtained from the several school districts. Each set was evaluated and ranked according to relative completeness of pupil performance data, including achievement test scores and attendance records, the variety of compensatory education programs represented, and the quantity and quality of financial data on hand.

The first approach assumes that programs are carried out in reasonably good agreement with the original proposal or project description and that there is little variation of program characteristics among recipient schools except as indicated in the program plan. The second approach attempts to catalog the distribution of program resources which actually occurred at the grade level in a school. It avoids the assumption of little variation of programs among schools and, therefore, requires more detailed information about participation, staffing, costs and changes of programs in a school in order to distinguish the CE increment from the regular school program.

Although the second approach is the more time consuming of the two, its use was desirable in one of the pilot analyses because of observed departures of programs from original proposals among many of the sample school districts. In many instances, this departure from a prescribed program resulted from an inability during the first year of Title I to hire staff personnel in the middle of the school year or to obtain equipment on short notice. The conduct of a given program during the following year, was more likely to be in accord with the budget and plan of the school district.

INFORMATION REQUIRED

Regardless of the approach employed, the objective was to obtain very detailed knowledge of programs, schools and pupils. Fragments of information must be assembled from many sources to develop and verify each estimate. The types of information desired include:

1. Program Descriptions — objectives, activities, personnel assigned, materials and supplies used, pupils (by schools and grades), time and duration of program, pupil participation and exposure.

2. School/Pupil Characteristics — ethnic composition, economic status, relative academic level, staff composition and turnover, special classes.

3. Attendance Records — by school and grade: average daily attendance, average daily membership, gains, losses, per cent attendance and absence, unusual factors or events influencing attendance.

4. Financial Records — district budget and expenditure reports, expenditures by school and project for regular and special programs, expenditures by time periods, sources of funds.

5. Evaluation Reports — objectives, activities, staff and pupil participation, project expenditures by time periods, staff and pupil performance, measurement devices and their characteristics.

ANALYSIS OF DISTRICT 10 CE PROGRAMS

This section describes the process and the wide range of information employed in allocating program expenditures to the grade level for District 10 sample schools. Detailed program and expenditure data are included.

Description of the Analysis

This has been an effort to pursue an approach which employs program information from school district plans, reports, and records as the basis for determining the incidence and intensity of CE activities and for estimating resource expenditure for individual grades in sample schools. District 10 was selected for this experimental effort because it was one of the few visited which records expenditures by school and because it was one of the few visited which records expenditures by school and because relatively detailed program information had been obtained. The initial step was to assemble description information on each CE project in the set of sample schools. This involved search of many documents of program descriptions, Title I applications, school district budgets, expenditure reports, and evaluation reports.

Next, descriptive and quantitative summaries were prepared for each project including objectives, principal activities, and resources employed. Where appropriate the descriptions indicate (1) the number of schools in the district and in the sample which had each project, (2) the number and grade levels of pupil participants, (3) total and per pupil expenditures, and (4) hours of pupil exposure.

Finally, when the grade levels served by each project had been identified, reported expenditures were allocated to appropriate grades by project and time period for each sample school.

The following sections describe the sample schools, some of their characteristics, and the bases for their selection; present the CE program descriptions; and summarize the results of this exercise.

Sample Schools and Their Characteristics

Table 25 lists the characteristics used as criteria for selection of the ten sample elementary schools and indicates the CE programs for each school in 1966-67.* When selecting the sample from approximately 55 schools eligible for Title I programs, an attempt was made to choose a sample which would possess a wide range of school characteristics. In addition to these criteria, schools were chosen to represent the mix of CE programs of the district. Eligible schools ranged in enrollment from 150 to over 2500 pupils and the sample schools chosen cover a large part of that range.

A high proportion of eligible schools had all-Negro pupil populations; however, some schools were selected which had the largest proportions of non-Negro pupils among the eligible schools. The selection was based on data compiled in the winter of 1965-66 to establish the initial eligibility of schools. The sample of ten schools included three which had substantial proportions of non-Negro pupils. Since that time, substantial change of pupil populations has occurred, and in 1966-67, only one of these schools reported having any non-Negro pupils.

About 16 percent of District 10 pupils were from low-income families; in eligible schools this percentage ranged up to 55 percent.† Sample schools had from 22 to 49 percent of economically deprived pupils. School personnel point out that high mobility — the movement of a pupil from one school to another — is a frequent characteristic of schools with substantial proportions of pupils from poorer economic circumstances. Indices of mobility were computed for the sample schools and are shown in Table 26 with attendance and racial concentration percentages. Considerable variation of pupil mobility exists, from year to year and from school to school, but no distinct pattern is indicated.

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* The selection criteria do not agree with similar information in subsequent tables due to different reporting periods.

† As computed for the 1965-66 Title I application, based on annual family income of less than $2,000.

Table 25. Sample selection criteria and compensatory education programs—District 10.

Selection Criteria				Compensatory Education Programs										
Sample Schools	Enrollment	% of Pupils from Low Income Families	% of Negro Pupils	Project	Teacher Aide	Adjustment Teaching	Reduction of Class Size	Clinical Reading	Language Arts Teacher Consultants	Centralized Library	Intensive Instructional Improvement (Tri-I)	English as Second Language	Pre-K Child Development (EOA)	Head Start (EOA)
1	186	27.3	79	x	x									x
2	570	35.5	100		x			x		x				x
3	1561	35.2	100		x		x			x				x
4	265	31.8	100		x									x
5	1618	25.3	100		x						x		x	x
6	272	37.0	88	x	x				x				x	x
7	293	22.2	54	x	x	x						x	x	x
8	776	22.0	100		x						x			x
9	506	32.1	100		x						x			x
10	545	49.1	100		x									x

Figure 9 permits comparisons to be made among racial concentration, mobility and attendance. These comparisons do not indicate obvious relationships among these characteristics. Neither mobility nor attendance appears associated with racial distribution. An inverse relationship between pupil mobility and attendance might be anticipated but these data do not support that expectation.

Table 26. Attendance, mobility and racial distribution of sample schools (percentages) in District 10.

School	Attendance				Mobility[a]				Negro Pupils			
	63-4	64-5	65-6	66-7	63-4	64-5	65-6	66-7	63-4	64-5	65-6	66-7
1	95	92	89	92	32	35	37	28	20	41	69	100
2	89	92	89	91	29	41	18	62	100	100	100	100
3	89	89	86	90	14	29	34	47	100	100	100	100
4	85	87	87	91	23	28	28	35	100	100	100	100
5	91	92	84	92	39	13	54	25	100	100	100	100
6	83	87	87	88	64	43	26	74	29	52	74	100
7	90	98	90	92	47	53	35	47	7	23	90	44
8	88	90	85	93	43	13	22	17	100	100	100	100
9	87	87	89	91	16	32	21	22	100	100	100	100
10	83	87	85	86	33	29	25	30	100	100	100	100

Note:
[a] (Gains + Losses) ÷ ADM.

Improved attendance is an objective of many CE programs. The following attendance data were obtained by school and grade for four consecutive years ending with the 1966-67 term: initial registration, gains, losses, end-of-year membership, average daily membership, average daily attendance, average daily absences, percent attendance, and percent absences. Attendance rates were summarized and examined to detect any systematic change that would be helpful in analyzing the effects of CE programs. Table 26 showed average annual attendance rates for the sample schools.

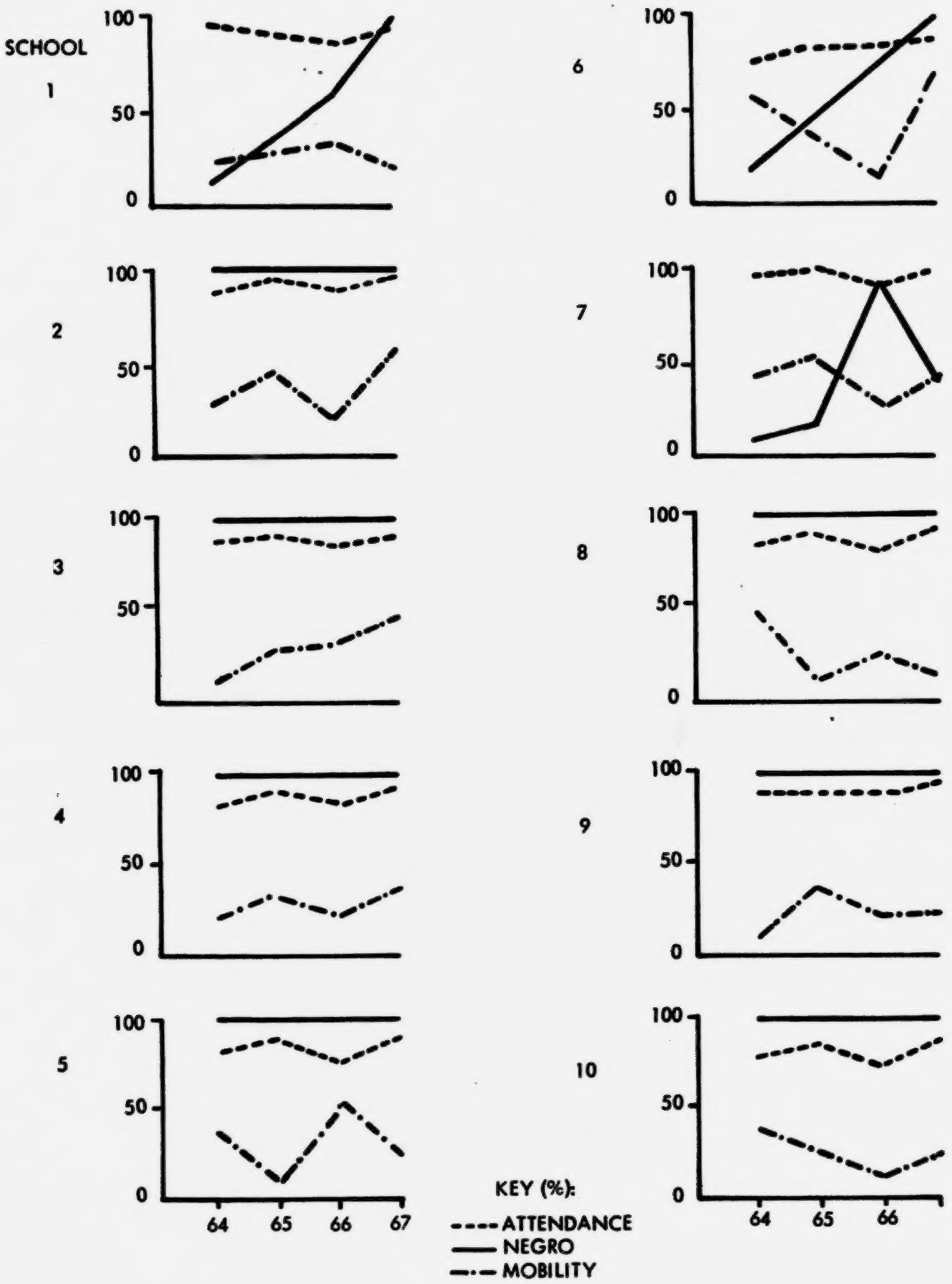

Figure 9. Racial distribution, mobility and trends of attendance (percent) in sample schools.

A mixed pattern of increases and decreases in attendance rates is apparent. Eight schools recorded decreased attendance for the 1965-66 school years. All ten sample schools reported increased attendance during the 1966-67 term. This is the only year of the period in which all of the sample schools recorded improved attendance rates. To avoid a hasty conclusion that this improvement resulted from CE programs, a more probable cause was sought — and found. Extensive storm damage was sustained in this school district early in the 1965-66 school year and widespread disruption of school activities was experienced during a period of weeks. The improved attendance of the following year more probably reflects the resumption of normal attendance. Additional analysis of attendance data has been reported in Section 2.

Monthly summaries of attendance data were not available at the central school office but probably could have been obtained from individual schools at the expense of additional time. If monthly data had been obtained, rather than average annual data, it might have been possible to omit the storm period from consideration and make a more sensitive appraisal of the impact of CE programs, and other factors, upon pupil attendance.

Program Descriptions

Sample schools had from one to four CE projects in 1966-67. One project, Quality Instruction, was supported by school district funds, eight projects were funded under Title I, ESEA, and two preschool projects were funded under the Economic Opportunity Act (EOA). The two EOA projects are listed for information only. Both were pre-kindergarten projects; no allocation effort was required and very little project description information was available. In addition, there was a district-wide summer CE program, called Reading-Enrichment-Recreation (RER), which is not listed in Table 25 because pupil participants were not identified by schools.

PROJECT: QUALITY INSTRUCTION. Purpose: To improve the quality of instruction in selected schools which are experiencing substantial change of pupil population due to racial integration.

Description: When the proportion of Negro pupils in a school exceeds one-third, the school may be selected for this project. More intensive services are allocated to the school which may include administrative or clinical personnel, classroom or specialist teachers, guidance counselors or teaching materials and supplies. This project is funded by the school district. Three of the sample schools received small increments of support from this project in 1966-67. It was reported that schools with this project seldom are eligible for Title I projects.

PROJECT: TEACHER AIDES. Purpose: To relieve teachers of non-professional and routine tasks in order to provide increased opportunity for creative teaching, planning, individualized instruction, and pupil counseling; to enable use of a greater variety and quality of instructional materials; to provide increased attention to the needs of disadvantaged children.

Description: In 1965-66, 352 teacher aides were assigned to as many classes in 53 schools, 1 per class with average class size of 30 plus, in kindergarten and grade 1, including 17 "3-1" schools.* Each aide was employed 4-1/2 hours per day for ten weeks. In 1966-67, 379 aides were assigned to classes in kindergarten, grade 1, and grade 2, in 54 schools, as follows: 345 part-time aides (4-1/2 hours daily, with 3 hours in classroom) were provided in 255 first grade, 83 second grade, and 6 combination first-second grade classrooms; full-time aides (6 hours with 5-3/4 hours in classroom) were assigned to 31 kindergartens; 3 aides were also assigned to upper elementary grades as an experiment. During this year, the aides participated for 27 weeks; all were high school graduates and over half had some college education. In 1965-66, the aides were supplemented by $350 of supplies and equipment per classroom in grades 1 and 2, e.g., tape recorders, film strips, picture sets. In 1966-67, $300 of equipment and supplies were provided each of the 84 second grade classrooms added to the aide project that year. The aides enabled teachers to devote more time to instruction; also they worked with children individually and in groups, especially in the area of language development (which was part of their in-service training).

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* Schools having the Intensive Instructional Improvement project, see page 77.

Table 27 summarizes Teacher Aide assignments in the sample schools during the two program periods.

Table 27. Teacher aide assignments.

SAMPLE SCHOOL	GRADE							
	MARCH-JUNE 1966				1966-67			
	K	1	2	C[a]	K	1	2	C[a]
1	1	2				2		
2	1	3		1		3		
3	2	10	1			11		2
4	1	1		1		2		1
5	3	7			3	7	7	
6	1	3			1	3		
7	1	2				2		
8	1	4			1	4	4	
9	1	2		1	1	2	2	
10	1	3				3		

Note:

[a] Combination of grades 1 and 2.

	1965-66	1966-67
Total Schools Served:	53	53
Sample Schools Served:	all 10	all 10
Total Pupils Served:	10,560*	11,461
Total Expenditure:	$488,472†	$911,833
Expenditure Per Pupil Served:	(10 wks) $44	(27 wks) $80
Hours/Pupil Exposure	225	K:800 1-2:600

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* Estimate: number of aides x 30 pupils/class

† Estimated from salary and equipment costs, plus estimated administrative overhead.

PROJECT: ADJUSTMENT TEACHING. Purpose: To meet the varying and special needs of grade 3 underachieving students from low-income areas.

Description: Adjustment teachers provided individualized tutoring to small groups of 8 to 10 pupils in any needed subject area. Each child in the project participated 40 minutes per day. Underachieving children were selected on basis of test scores, cumulative records, and teacher observations. This project was initiated in the fall of 1966 and was reported to have continued for 20 weeks.

	1966-67
Total Schools Served:	8
Sample Schools Served (School 7):	1
Total Pupils Served:	430*
Total Expenditure:	\$60,000†
Expenditure Per Pupil Served:	\$139
Hours/Pupil Exposure:	67

PROJECT: REDUCTION OF CLASS SIZE. Purpose: To help make possible individualized instruction by reducing the size of classes.

Description: Class size was reduced in grade 1 of twelve schools through the use of portable classrooms. In 1965-66, expenditure of \$847,477 was made to obtain 17 portable classrooms. In the following year, 15 additional teachers were employed to use them.

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* Estimated: 9 pupils x 6 hours/day x 8 schools

† Estimated: 8 teachers at \$7,500 (average salary and benefits)

	1966-67
Total Schools Served:	12
Sample Schools Served (School 3):	1
Total Pupils Served:	720*
Total Expenditure:	$257,248†
Expenditure Per Pupil Served:	$357
Hours/Pupil Exposure:	450**

PROJECT: CLINICAL READING. Purpose: To improve writing, reading, spelling, work habits, and powers of concentration in grades 3 through 6.

Description: Clinical Reading Centers were established by the school district, before ESEA programs, in elementary and secondary schools. Title I funds permitted expansion of this project. In 1965-66, 10 after-day centers were established, serving 15 pupils each for one hour each day. In 1966-67, 8 after-day centers were continued and additional day centers were established, two full- and two half-day centers. In the day centers, groups of 32-35 pupils receive 45-60 minutes/day of instruction instead of another class activity which would be missed least. The day program served pupils in grades 3 - 6, for 28 weeks (1966-67) at 5 hours/week. The after day programs served grades 4 and 5, for 24 weeks (1966-67) at 5 hours/week; class size was reduced to 8 - 10 pupils in 1966-67.

The following summary describes the incremental portion of the program, made possible by Title I support. The Center in the sample school was funded by the school district but is representative of other centers which were funded by ESEA.

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[*] Estimate: 12 schools x 30 pupils x 2 classes/day.

[†] Estimate: 15 teachers x $7,500 average salary plus 1/10 of construction costs (based on estimated 10 year life of a portable classroom.

[**] Estimate: 30 weeks x 5 days/week x 3 hours/day (two half-day classes).

	1965-66	1966-67
Total Schools Served:	10	12
Sample Schools Served (School 2):	1	1
Total Pupils Served: after-day*	151	81
day	--	89
Total Expenditure:*	$49, 555	$107, 379
Expenditure Per Pupil:*	$328	$631
Hours/Pupil Exposure:*	75	50

PROJECT: LANGUAGE ARTS TEACHING CONSULTANTS. Purpose: To provide imaginative approaches to meeting individual needs of underachieving pupils, in all phases of listening, speaking, reading, and writing.

Description: Two language arts teaching consultants worked in two schools with small groups of children who were achieving below grade level, in grades 1 through 6. The project encompassed all phases of listening, speaking, reading and writing, using innovative approaches and materials not used in the regular classroom. Groups consisted of about 8 children from each grade level, with meetings daily during class hours, plus one hour after school for special tutoring and recreational reading. The project also included field trips; auditory and visual examinations; and parent involvement.

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* These data are recorded here as reported by the project supervisor even though the basis for computation may differ from other projects described in this section.

	1965-66	1966-67
Total Schools Served:	2	2
Sample Schools Served (School 6):	1	1
Total Pupils Served:	120	88
Total Expenditure:	$15,900	$32,741
Expenditures per Pupil Served	$133	$372*
Hours/Pupil Exposure:	50†	300†

PROJECT: CENTRALIZED LIBRARIES. Purpose: To enable school libraries to serve both school and community. They are designed to be accessible to the neighborhood after school hours and during the summer, as well as to provide varied instructional and enrichment materials as part of the school program.

Description: The project was initiated in 1965-66 and continued during the following year. It involved the assignment of librarians to elementary schools for the first time. Libraries have been, or are being, developed in 15 schools employing portable buildings, renovations, new construction, and limited service to two schools without librarians or furniture. Five libraries began providing services in January 1967; the remainder are in the process of development. A center was established to process books for six of these libraries.

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* Per pupil expenditure for those directly participating; a figure of $77.59 was given which "includes all children in grades one through six in the two schools involved in the project because it is felt that all were affected directly or indirectly by the project."

† In 1965-66, project started in one school 6 weeks before close of school year; in other schools, 4 weeks before close. Estimates assume 1 hour during school day and 1 hour after school, daily for 5 and 30 weeks respectively, allowing for holidays and absences.

	1965-66	1966-67
Total Schools Served:	-	5
Sample Schools Served:	-	(Schools 2&3) 2
Total Expenditure:*	$460, 584	$441, 092

PROJECT: INTENSIVE INSTRUCTIONAL IMPROVEMENT. Purpose: To concentrate services in 17 elementary schools in low-income areas where pupils consistently have tested low in readiness and achievement, among the most educationally disadvantaged in the system.

Description: This project was in operation for about 21 weeks of the 1966-67 school year, starting in January 1967. Services included the areas of administration, instruction, health, and social work. Adjustment teachers aided selected third grade pupils and consultants participated "to intensify and vitalize learning experiences." Teachers aides were assigned to grades K, 1 and 2. After-school tutoring was available, especially in reading; selected pupils participated thrice weekly for an hour in groups of 4 to 10. A total of 1961 pupils received up to 50 hours of tutoring.

Each school in this project had physical education, art and music programs. Instructional materials, designed for disadvantaged pupils, were provided — $100 per classroom in grades 3 through 6 plus $1 per child in the tutoring class. Administrative assistants in six of the largest schools, with enrollments exceeding 1300, enabled the principals to devote more time to improving instruction. One person devoted half-time each to the duties of administrative assistant and adjustment teacher. Social and attendance workers visited pupil homes; counseling was available for parents and referral to community social and welfare agencies. Extensive medical and dental examinations were made; funds for correcting defects were obtained from community service agencies.

Teachers and principals determined and requested specific kinds of help from consultants, identified problem areas, and recommended instructional materials. There were 5 primary and 4 upper elementary consultants, a ratio of one consultant for 50 teachers. Teachers were given released time to "pursue professional tasks independently."

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* These are only part of the total cost of the project, to be completed in the future. Adequate information on costs of developing, stocking, and operating of these libraries is not available.

Additional staff included:

14 adjustment teachers for 3rd grade
6 administrative assistants/adjustment teachers
10 consultants
2 music consultants, grades 4, 5, 6
4 itinerant art teachers, grades 4, 5, 6
18 physical education teachers
6 health staff (4 nurses, dental hygienist, health coordinator)
15 social services (8 visiting teachers, 6 attendance workers, 1 coordinator)
1 director

76 Total

	1966-67
Total Schools Served:	17
Sample Schools Served (Schools 5, 8 and 9)	3
Total Pupils Served:	16,500
Total Expenditure:	$685,014*
Expense Per Pupil Served:	$41.50
Hours/Pupil Exposure:	630†

PROJECT: ENGLISH AS A SECOND LANGUAGE. **Purpose:** To teach English to children with other native languages, who often hear no English spoken at home, and to provide a better understanding of regular classroom activities.

Description: Teachers worked with small groups, using audio-visual-lingual techniques. The project started in the summer of 1966, continued during the regular school year 1966-67, and was conducted during the summer of 1967 as an integral part of the

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[*] Does not include funds spent in 3-I schools under other Title I projects — e.g., teacher aides were in the teacher aide project budget.

[†] Estimated on basis of 21 weeks x 5 days per week x 6 hours per day (assuming no absences or holidays).

Reading-Enrichment-Recreation (RER) project, discussed below. In the summer sessions, each child participated 2 hours a day for 6 weeks. In the 1966-67 school year, participation was generally 1 hour a day, although some variation according to individual needs was allowed.

	Summer 1966	1966-67	Summer 1967
Total Schools Served:	n/a	9	n/a
Sample Schools Served:	n/a (School 7)	1 (avg. 35 pupils/class)	n/a
Total Pupils Served:	303	320	365
Total Expenditure:	$51, 182	$65, 981	*
Exp. Per Pupil Served:	$ 169	$ 206	*
Hours/Pupil Exposure	60	150	60

PROJECT: SUMMER READING-ENRICHMENT-RECREATION (RER). Purpose: To provide special educational, cultural, and recreational services to educationally deprived children in grades 2 through 12 (grade 1 not included in 1966). Specific objectives, as expressed for 1967, were to improve classroom performance in reading beyond usual expectations; to improve children's verbal functioning; to improve artistic awareness and self-expression; to improve the children's self-image; to increase their expectations of success in school; to improve the health of the children through physical fitness.

Description: An RER center was located in each of the 54 Title I schools. The six-week project in the summer of 1966 consisted of morning sessions (3-1/2 hours including breaks) with one hour devoted to each of reading and language skills, cultural enrichment, and physical education, and a 2 hour afternoon recreational program which was open to any child, regardless of whether enrolled in the morning classes. Pupil-teacher ratios in the classes were as follows: remedial and language arts, 10:1; cultural enrichment, 15:1 (20:1 in 1967); physical education, with trained instructor, 25:1; (in practice, in physical education, trained instructors were not always available and class size sometimes exceeded 30). Total elementary instructional staff in 1967 was 447 teachers and 11 consultants for an overall ratio

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* Part of overall RER budget.

of about 18:1. Each child went on 3 field trips, cultural enrichment field trips, with this experience being worked into the content of the reading program. The project provided innovative instructional materials and equipment, delayed in 1966. The 1965-66 evaluation states, "...techniques, materials and activities which duplicated those used during the regular school year were least successful in producing the desired behaviors." Experience with art, music and drama (including pupil participation) were provided. The afternoon recreation program concentrated on group sports and games. Secondary students with knowledge of playing an instrument took part in instrumental music program three afternoons a week. Light snacks were served to elementary pupils during morning breaks.

The summer program, 1967, was similar to that in 1966 except that (1) grade 1 pupils could also participate; (2) the session lasted for 6-1/2 weeks, plus 1 week of pre-service training for staff; (3) the elementary cultural enrichment portion of the program was focused more specifically on language arts; (4) the secondary RER program was changed more radically so that emphasis in the academic part of the program "shifted more or less exclusively to the language arts; especially reading, although music also continued to be a strong feature, including jazz performances." A wide selection of reading materials was made available (although again delayed), e.g., paperback books for secondary pupils. Substantial attrition of these books was anticipated, even sought. One supervisor believed that disappearing books would indicate greater pupil interest in reading. Some teaching equipment was employed, such as tape recorders.

The supervised recreation portion of the project was continued without substantial change and employed the equipment that had been purchased for the program of the preceding summer. In 1967, it was extended beyond the end of the academic program (to August 18). The English as Second Language project was included in the summer 1967 activities.

	Summer 1966	Summer 1967
Total Schools Served:*	54	54
Sample Schools Served:	all 10	all 10
Total Pupils Served:	9,000	9,939[†]
Total Expenditure:	$2,534,189**	$1,302,213
Expenditure Per Pupil Served:	$282	$131
Hours/Pupil Exposure[‡]	90	90

Expenditures, by School and Program

This school system was one of the few visited that records expenditures for individual schools. Expenditure data were furnished by accounting categories, for the regular school programs of 1964-65, 1965-66, and 1966-67 and for the compensatory education projects of 1965-66 and 1966-67. Table 28 is a sample of the type of information obtained. Tables 62 through 70 in Appendix G contain information for the other 9 schools. Table 29 summarizes total expenditures, by school and year, for the regular and CE programs. The prinicipal impact of this information is that it reveals considerable variations of per-pupil expenditure, even for what is described as the same mix of programs. For the regular program of 1964-65, the largest per-pupil expenditure was more than double that of the smallest. Similar

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[*] Elementary and secondary schools combined.

[†] Of the 9,939 enrollment, about 72 percent enrolled in the center where they regularly attend classes; 19 percent enrolled in another center; 7.7 percent were children attending parochial schools; 1.2 percent were children attending other private schools. About 1,800 were secondary level pupils—for these, there was a high attrition rate; perhaps 50 percent left the program before its end. The best maintenance of attendance at secondary level was at grades 7 and 8.

[**] Including about $860,000 for playground or sports equipment.

[‡] Three hours/day for 6 weeks (not including afternoon or extended recreation programs).

Table 28. Expenditures for regular and compensatory education programs—School 1.

District 10 School 01	Regular School Programs						Compensatory Education Programs							
Expenditure Categories							Teacher Aides Adjustment Teaching Reduced Class Size				Project Quality			
	64-65		65-66		66-67		65-66		66-67		65-66		66-67	
	#	$	#	$	#	$	#	$	#	$	#	$	#	$
Principals, Consultants, Supervisors	1	8647	1	9006	1	11474		30						
Teachers	6	31268	6	33291	8	55062	3	2481	2	2993				3228
Library, Audio-visual & TV Personnel								18						
Secretarial-Clerical	1	3536	1	3623	1	4070								
Total Salaries		43451		45920		70606		2529		2993				3228
Teaching Supplies & Other Expenses		251		356		388		647		317				1885
Total Instructional Expenses		43702		46276		70994		3176		3310				5113
Health Services														
Pupil Transportation														
Plant Operation & Maintenance		7977		7643		10726								27
Fixed Charges								109		131				143
Food Services														
Student/Community Activities														
Total Support Expenses		7977		7643		10726		109		131				170
Teaching Equipment						135		519		139				209
Total Expenses		51679		53919		81855		3804		3580				5492

Table 29. Summary of program expenditures of District 10.[a]

Sample School	1964-65		1965-66				1966-67			
	Regular Budget		Regular Budget		CE Budget		Regular Budget		CE Budget	
	Total Exp. $	$/Pupil[b]	Total Exp. $	$/Pupil	Total Exp. $	$/Pupil	Total Exp. $	$/Pupil	Total Exp. $	$/Pupil
1	51679	407	53919	283	3804	20	81855	437	9072	48
2	112599	215	113388	199	23427	41	142895	264	35946	66
3	291951	200	304390	207	22437	15	392695	305	32266	25
4	60938	256	67231	269	2806	11	81596	334	4861	20
5	292636	178	310381	236	11690	9	392871	253	36683	24
6	68356	289	68420	256	10528	39	93084	288	21631	67
7	84713	332	90710	308	12965	44	116498	361	18856	58
8	161981	218	140492	192	5865	8	186801	294	19381	31
9	137535	237	135035	266	4831	10	183856	412	10789	24
10	95944	180	103430	195	4854	9	134473	273	4864	10

Notes:

[a] Expenditures of the summer project (RER) were not reported by schools and are not included.

[b] Per pupil expenditures are based on ADM from the year end attendance report.

but lesser disparities are shown for the subsequent years. For schools with the same CE projects, per-pupil expenditures also vary in the same way. For example, while schools 4 and 10 each had the same CE project in 1966-67, the per-pupil expenditures in the former were double those of the latter. This variation is not due to different numbers of teachers or other resources added. Schools 5, 8 and 9 had the same two CE projects in 1966-67, yet the largest per pupil expenditure was about 25 percent greater than the smallest. Similar differences are shown for 1965-66.

These differences raise some important questions. The reliability of estimates of CE program cost by grade and school based on district level program information depend on the degree of standardization of programs among pupils served. If equal amounts of a resource are added by a project for each school but numbers of pupils differ, it is not really meaningful to assume that the results of the project will be similar among schools.

Moreover, even with a similar per-pupil allocation, resources may actually be employed in different ways. The statistics show variations of per-pupil expenditures between schools; they do not show variations of the employment of resources within a school or class. Consider a project in which a reading teacher instructs five pupils of a class. Her impact on the five pupils is not altered by the large or small number of pupils who constitute the remainder of the class. At the same time, allocation of the costs of teacher and materials to the whole class does not reflect the real impact or cost per pupil of the project. If allocation is made on the basis of the five pupils served directly, no recognition is given to the widely claimed "spillover effects." Allocation to the grade level may involve unknown amounts of error in estimates of exposure to project activities.

Not only are there substantial variations of per-pupil expenditures between schools which have the same mix of projects but these "build" on very substantial differences of the regular budget per-pupil expenditures. Other variations are shown by school, from year to year, not all of which are increases, as public information records to be the rule for schools in general. Half of the sample schools had spent less per pupil in 1965-66 than in the preceding year.

There are at least three factors which account for much, perhaps all, of these differences of per-pupil expenditures. Frequent and considerable variation of school registration or ADM is indicated by end-of-year pupil accounting data obtained for this study. School administrators plan budgets based on anticipated school enrollment for the coming year. They cannot control the number of pupils who change schools. Rarely do they change the boundaries of school service areas to offset enrollment fluctuations; they do not wish to cause frequent disturbances of pupil-school-community relationships. School area boundaries are changed when the physical capacity of a school is exceeded as may be caused by growth of pupil populations. Another factor is the trend of increased salaries in recent years. The larger regular budgets of all sample schools in 1966-67 were caused, at least in part, by salary increases which averaged $1, 500 per year for teachers. Finally, teacher seniority and salaries account for another element of variation.

Such variations of expenditures will complicate any attempt to compare programs on a cost-benefit basis, i.e., to seek the cost of obtaining a unit of increased pupil performance via alternative CE approaches. Salary differences among teachers, changes of salary scales, and changes of expenditures for materials or equipment are subject to control of school administrators and can be taken into account. Fluctuations of pupil enrollment are not controllable and are a source of error or reduced precision in evaluating the benefits and costs of educational activities.

Allocation, by School and Grade

When the school district accounting system permits summarizing expenditures by school and program, the methods for allocating these expenditures to grades are relatively simple. The difficult part of the process is that of determining which program activities were directed at each of the several grades of a school. This task involved searching through many documents in order to assemble a reasonably complete list of assignment of programs to grades. Frequent discrepancies and disparities were found. For example, expenditures reported in different sources often were in conflict; some were estimates for which the basis was not always clear, others were partial or total expenditures but for different time periods.

After compiling and checking the information on hand, preliminary drafts of project descriptions were prepared. Unresolved questions were referred to district and project administrators who were very helpful in providing additional information and explanations. When the information was considered reasonably complete, the project descriptions were written. From this search was obtained the grade level assignment of the several projects. The final step was the arithmetical exercise of distributing stated expenditures at the school level to the grades served. Except when project information indicated otherwise, expenditures were allocated to grades in proportion to the numbers of pupils in that grade for each year.

Table 30 is an example of the results of this exercise and contains estimates of regular and CE program expenditures, by school, grade, and year.* Information for the other 9 schools in contained is Tables 71 through 79. These allocations must be regarded as estimates, at least until verified by school district administrators.† Caution must be exercised when comparing these estimates with changes of pupil performance. The time periods during which these estimated funds were expended do not necessarily coincide with that of the pre- and post-test measurements. Some refinements or reallocations may be appropriate before undertaking more sophisticated analysis, such as regression studies. This may require assuming specific rates of expenditure of resources month by month rather than a constant rate of expenditure through the school year. The following discussion is based on the constant-rate assumption.

Effects of CE Programs on Achievement

Analysis of achievement test scores has been reported in Section 2. Only a brief recapitulation is made here in order to complete this case study. Figure 10 summarizes changes of first deciles and means of reading test scores of grades in sample schools for which the achievement test data were suitable for statistical analysis. For example, consider the changes recorded for grades 3 and 4 of School 1.

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* These estimates, on a per-pupil basis, do not agree with the per-pupil estimates of project descriptions above. They were computed on different bases and from different data. These estimates are based on reported expenditures and were computed from the total number of pupils in a class. The estimates of the project descriptions were made chiefly from budgetary cost information and attempt to indicate expenditures for pupils who participated directly in a project.

† Totals are reported expenditures; columns may not add to the totals due to rounding.

Table 30. Program expenditures by grades of School 1.[a]

1965-66		Regular Programs	Teacher Aides, Adjustment Teachers, Reduced Class Size			Total CE Programs
Grade	ADM	$	$			$
K	29	7411	994			994
1	57	14565	1953			1953
2	25	6388	857			857
3	24	6133				
4	26	6644				
5	21	5367				
6	7	1789				
Sp.	22	5622				
Totals	211	53919	3804			3804

1966-67		Regular Programs	Teacher Aides, Adjustment Teachers, Reduced Class Size	Project Quality		Total CE Programs
Grade	ADM	$	$	$		$
K	30	13567	1085	910		1995
1	35	15828	1266	1062		2328
2	34	15376	1229	1031		2260
3	19	8592		577		577
4	18	8140		546		546
5	20	9045		607		607
6	14	6331		425		425
Sp.	11	4974		334		334
Totals	181	81855	3580	5492		9072

Note:

[a] Per-pupil expenditures for regular and CE projects of the ten sample schools are given in Table 28.

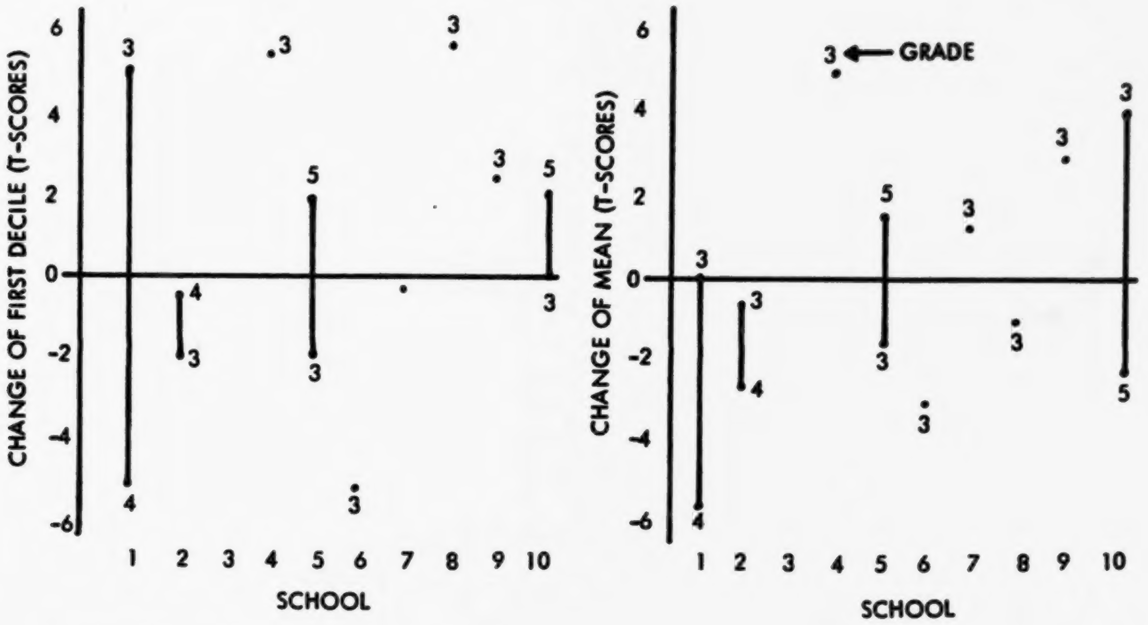

Figure 10. Observed change of reading achievement for test period September 1965 to September 1966—District 10.

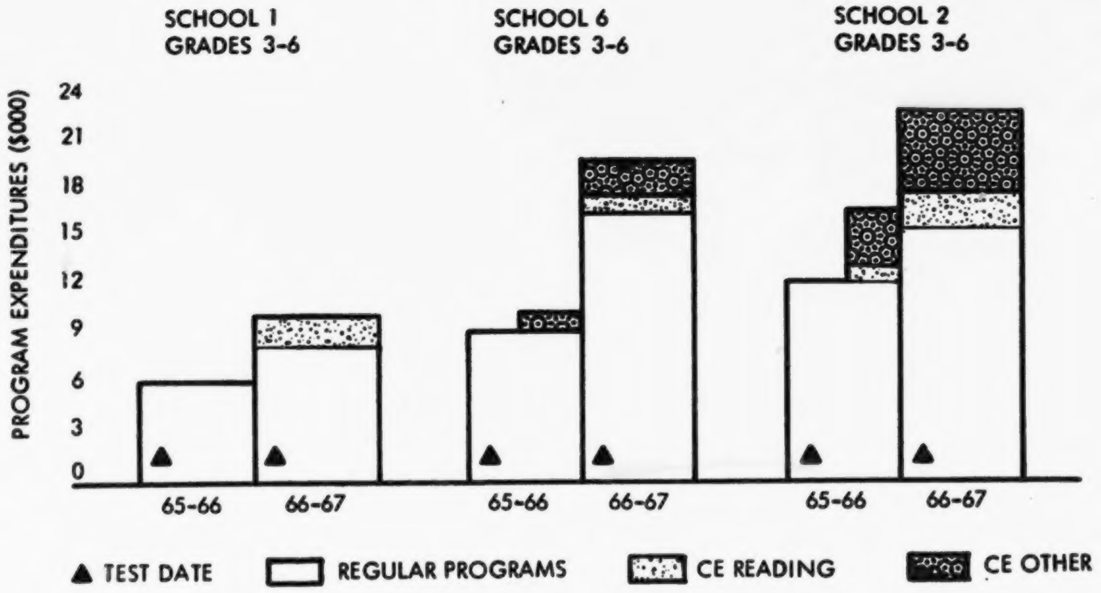

Figure 11. Exposure to CE—selected schools.

The score of the third grade pupil at the first decile was 5 units greater on the post-test while the score of a classmate at the mean did not increase. Scores of fourth grade pupils at the first decile and mean were lower on the post-test than when tested one year earlier. This figure records about equal incidence of negative and positive changes of these measures. No consistent pattern of change is shown, by school or grade. These measures, and others reported in Section 2, yield no indications of significant change of reading achievement.

No relationships were found between change of pupil test scores and type of CE programs or level of expenditure. Table 31 gives the relevant data for grade 3 in nine schools. The change in the mean and at the first decile were not more favorable in those cases where per pupil expenditures on CE were the highest. This absence of the desired results is not unexpected; the following paragraphs present some of the reasons.

First, achievement test scores analyzed did not match well with the grades which had CE projects. Test data were not obtained for some grades. In particular, all sample schools had the Teacher Aide project in grades K through 2 but test results were not obtained. Some of the test data received could not be made suitable for statistical processing. For example, either pre- or post-test scores were not available for some grades. Table 32 compares the grades for which pre- and post-test scores were used to measure changes with the grade levels which participated in CE activities.

Next, not all of the CE projects could be expected to have impact upon reading performance. Only one of the ten projects was oriented directly toward improving reading achievement and it served limited numbers of pupils. Two projects focused upon English language arts of which reading is an essential part. Two other projects included reading content; one was started after the post-test date, the other was a summer program for which pupil participants from the sample schools cannot be identified. The remaining five projects provided additional personnel, materials, or equipment for use in other instructional activities. Table 32 shows that only three of the sample schools (2, 6, 7) had reading-oriented CE projects in 1965-66.

Figure 11 demonstrates the exposure of pupils to CE activities in three sample schools. The relative magnitudes of regular and CE expenditures are shown on the vertical axis.

Table 31. Expenditures Grade 2 (1965-66) and achievement data for Grade 3 (September 1966) of District 10.

School[a]	Regular Program	Total CE	ADM	Expenditures/pupil		Pre $\overline{X}$	$\Delta\overline{X}$	ΔD_1	ΔQ_1	ΔQ_3
				CE	CE + Reg.					
8	18545	2108	101	21	204	34.5	-1.4	6.0	-1.0	-5.2
4	10360	921	43	21	262	31.4	4.8	5.7	3.8	2.5
1	6384	857	25	34	290	36.0	0.1	4.8	1.5	-2.0
9	20729	2106	85	25	269	31.1	3.0	2.0	5.0	1.0
7	12763	2481	46	54	331	36.6	1.0	0.6	3.0	-1.7
10	13715	1704	76	22	203	25.5	4.0	0.0	6.0	3.3
2	13924	2433	76	32	215	34.2	-0.9	-2.0	-2.0	-1.0
5	51120	6337	218	29	264	32.5	-1.7	-2.0	-3.0	-3.0
6	14375	2954	58	51	298	33.2	-3.0	-5.2	-4.0	-1.0
3	46085	6559	245	27	194	Not available				
Average of above	20,798	2846	97	32	253	32.8	0.6	1.1	1.0	-0.7

Note:

[a] Schools arranged by order of magnitude on observed changes in D_1.

Table 32. Comparisons between grades with CE projects and grades for which achievement data could be analyzed.

School	GRADES FOR WHICH ACHIEVEMENT TEST DATA WERE ANALYZED		GRADES WHICH HAD CE PROJECTS	
	Pre (9/65)	Post (9/66)	65-66	66-67
1	3,4	3,4	K-2	K-2
2	3,4	3,4	K-2, 1-6, 3-6[a]	K-2, 1-6 3-6[a]
3	-	-	K-2, 1-6	K-2, 1-6
4	3	3	K-2	K-2
5	3,5	3,5	K-2	K-2, 3-6[a]
6	3	3	K-2, 1-6[a]	K-2, 1-6, 1-6[a]
7	3	3	K-2, 1-6[a]	K-2, 1-6, 1-6[a]
8	3	3	K-2	K-2, 3-6[a]
9	3	3	K-2	K-2, 3-6[a]
10	3,5	3,5	K-2	K-2

Note:

[a] Projects which had at least some reading emphasis.

School 1 illustrates the situation of minimum pupil exposure, about one month, in a CE project which added limited amounts of personnel, materials or equipment to the school program. A pupil in School 6 who was in a 3rd grade in 1965-66 and progressed to the 4th grade for the following year might have received 5 or 6 months of exposure in a language arts activity. In this school, the CE expenditures were greater in absolute and relative terms. A similar pupil in School 2 could have received about the same length of exposure in a project with definite reading orientation. Per-pupil expenditures for CE projects were greater in School 6 than in other schools of the sample (see Table 28).

Finally, because achievement tests were given in the fall (September 1965 and September 1966), only a limited amount of exposure to CE activities could be represented by the test data.

For projects initiated soon after Title I funds were made available in 1966, pupils could have received as much as five months of exposure prior to the post test. If they participated in the summer reading project also, a maximum of 7 months exposure could be obtained. Since no project was a full-time activity, it is improbable that more than a few pupils received as much as 7 months of part-time exposure to CE activities.

Summary of District 10 Case Study

This case study required about eight man-weeks of effort after the data had been obtained. A return trip of about one week would be required to verify the expenditure estimates. Similar studies of other school districts probably would require greater effort and time.

Several observations can be made about this study of CE programs of one school district:

1. No obvious relationships were found among pupil mobility, the proportions of Negro pupils in the sample schools, and attendance rates.
2. It was not possible to determine if CE projects had any impact on pupil attendance rates. More detailed data would be required to eliminate the impacts of other factors.
3. Half of the ten CE programs of this school district added modest increments of personnel, materials, or equipment to the activities of a school. It will be very difficult to discover the impact of these resources on pupil performance, as measured by tests of reading achievement.
4. Change of reading achievement may be very difficult to measure at the grade level. Only one CE project had a primary and direct focus on reading achievement, four others had varying degrees of reading orientation. Only a fraction of pupils in a grade, probably less than 25 percent, received direct impact of these projects.
5. Considerable variation of per-pupil expenditures was noted. In some cases, the variation of the per-pupil expenditure of the regular school program from year to year exceeded the CE increment for either year.
6. No significant change of reading achievement was found and no relationships were discovered between change of reading test scores and type of CE activity or level of expenditure. There was little reason to expect substantial change in view of the unlimited amounts of pupil exposure represented by the pre-post test period.

7. When detailed project information and expenditures data are known by project and school, the allocation process is not particularly difficult. If either type of information is lacking, it may be impossible to obtain reasonably accurate estimates. Without such accuracy, the probability of gaining meaningful results from cost-benefit comparisons is extremely limited.

ANALYSIS OF DISTRICT 13 CE PROGRAMS

This section summarizes CE activities of District 13, describes the selection of sample schools, presents the method used to estimate CE resources at the grade level, describes the characteristics of CE projects, summarizes CE project expenditures for two grades in each of two schools, and compares these expenditures with changes in achievement test scores.

Background of District CE Activities

Compensatory education in School District 13 consists primarily of the comprehensive program funded under Title I, ESEA supplemented by other federal, state, and local CE activities. For the 1965-66 school year, 26 activities were organized into four projects: Pre-kindergarten, Remedial and Corrective Basic Skills Development, Cultural Enrichment, and Supportive Auxiliary Services.* Twenty-three public elementary schools and nine public secondary, continuation or adjustment schools with total enrollment of 25, 500 students were included, plus four elementary parochial schools and one secondary parochial school, totaling about 2, 000 students. The public schools served census tracts in which 7 percent to 22 percent of the families reported incomes under $2, 000 in 1959. In the following year, one public elementary school and one public secondary school were added. Title I funding of the pre-kindergarten project was terminated. Budgets for these projects are shown in Table 33.

Title I projects and funds were approved early in 1966. Implementation was delayed by non-availability of staff or equipment and by construction or procurement lags. Deviations from original plans

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* The district reported 37 CE activities. These were summarized to 26 for this study.

Table 33. Title I project budgets in District 13.[a]

Project	1965-66	1966-67
Pre-kindergarten	$ 243,000	$ 0
Remedial & Corrective Skills	1,075,000	911,000
Cultural Enrichment	486,000	79,000
Auxiliary & Supportive Ser.	668,000	994,000
Overhead & Fixed Charges	130,000	227,000
TOTALS	$2,602,000	$2,211,000

Note:

[a] Data were obtained from District CE plans of December 1965 and July 1966, and from the 1966-67 Title I budget status report of June 1967.

were sometimes required, but expenditures for 1965-66 were reported as reasonably close to the budget amounts. In 1966-67 a reduced budget was approved and commitment of financial support was not received until after the beginning of that school year. This caused some disruption to the current program including some reductions to meet the lower budget level.

In addition to the Title I projects, this district has pursued other CE activities with federal, state, and local support. In 1963-64 and 1964-65, a pilot project was conducted in five schools, and provided a wide range of activities at a funding level of $50,000 per year. A second State CE program, initiated in 1966-67, provided a three-part effort to reduce elementary school pupil-teacher ratios, build facilities at nine elementary schools, and provide a demonstration reading program in one junior high school. In 1964-65 a counseling project, supported by National Defense Education Act and local funds, was operated in several secondary schools, and provided services apparently similar to the Title I program.

Sample Schools and Their Characteristics

Data on the following school and pupil characteristics were examined: percent eligible pupils, percent Negro pupils, percent Spanish speaking pupils, school enrollment, numbers of instructional personnel, and pupil mobility. Insofar as possible, schools were selected to represent a wide range of these characteristics in order to determine whether relationships exist between the outcomes of CE activities and characterisitics of the recipient pupil population. These characteristics are summarized in Table 34.

Seven elementary and four secondary schools were selected. These schools had enrollments from 423 to 1,918 pupils and employed from 17 to 86 teachers. School populations consisted of from 11 to 91 percent Negro pupils and from 7 to 84 percent Spanish speaking pupils. From 8 to 19 percent of the pupils in these schools were from families with income under $2,000 per year. Pupil mobility* in the sample schools ranged from 16 to 79 percent.

Descriptions of CE Activities

This district has pursued a wide range of CE activities, some preceding and others in addition to those made possible by Title I, ESEA. To estimate the allocation of resources to grades requires knowledge of the several CE activities of the district; but their large number precludes detailed discussion of each one. The following paragraphs present brief descriptions of District 13's CE activities. Thirty-seven activities, identified by the district, have been summarized to twenty-six activities for this study. In the process of summarizing, some activities were combined and others, which did not serve pupils in elementary and secondary grades, were excluded, e.g., pre-school and adult education activities.

Remedial and Corrective Basic Skills Activities

PRIMARY REMEDIAL READING. To provide remedial reading assistance to children of average or better ability but who are under achievers. This program has been provided for grades 2 and 3 for

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* Defined as: (total students entering or withdrawing from a school during the 2nd through the 9th month of the school year) ÷ (average school enrollment during the school year).

Table 34. Sample school characteristics, 1965-66.

School Characteristics	School Number										
	1	2	3	4	5	6	7	8	9	10	11
Enrollment	825	601	546	851	423	830	821	1085	1603	1360	1918
Instructional Personnel	24	20	17	32	15	29	32	52	78	62	86
Pupil Mobility (%)	79	77	61	56	39	78	56	38	46	32	16
Negro Pupils (%)	8	24	56	80	11	44	91	70	59	69	23
Spanish Speaking Pupils (%)	14	21	11	12	84	40	7	14	32	16	23
Percent of Pupils from families with income under $2000/yr in 1959	8	10	12	12	18	19	19	10	15	10	9

several years with district funds; Title I support permitted expansion of this program to provide additional teacher specialists for eligible public and parochial schools and to include pupils in grades 1 and 4.

READING ADJUSTMENT CLASSES. To help students in grades 7 and 8 who have average or better intelligence but whose reading achievement is at least 2 years retarded. Reading problems were diagnosed and pupils placed in groups of 8 under 2 teachers with special training or experience. Teacher aides and additional equipment were provided. Title I funds supported this project in 3 schools.

REMEDIAL READING. Similar to the above project, to meet needs of pupils in grades 7 to 12 with lesser reading retardation, in groups of 15 to 18 pupils. Already a district-supported project, ESEA funds provided additional classes in 6 schools.

ENGLISH AS A SECOND LANGUAGE. To help non-English speaking pupils to develop fundamental English language skills and to prepare them for regular school programs. An aural-lingual approach was used at beginning, intermediate, and advanced instructional levels. A class of 18 pupils was provided with a teacher aide or assistant, tutors, materials, and equipment. Some portable classrooms were obtained. This is an expansion of an existing project.

CLASSES FOR EDUCATIONALLY HANDICAPPED PUPILS. A remediation project to provide more attention to problems of academically handicapped pupils of average or greater ability but retarded in basic skills. Small groups of pupils (15-20) in elementary grades were assigned to a teacher on a full-day schedule. A resource teacher, materials, in-service training and portable classrooms were provided. Title I funds enlarged an existing activity.

Cultural Enrichment Activities

CULTURAL ENRICHMENT. A number of activities were provided to motivate and stimulate elementary and secondary pupils of disadvantaged areas, including: art and music classes, enriched summer session and Saturday classes for talented pupils, assembly programs and cultural exchange, study trips, oral communications skills festival, equipment for remedial use and cultural enrichment in business education, and equipment for instruction in home management and personal development.

LIBRARY SERVICES. ESEA funds were used to expand a modest district program to provide and equip libraries in elementary schools and secondary target area schools and to provide personnel for greater library availability.

CLASSES FOR MORE ABLE PUPILS. More able pupils in grades 3-6 were grouped into an enriched and accelerated program in four centers. A resource teacher, field trips, visiting teachers, special equipment, and in-service training were provided.

Auxiliary and Supportive Services Activities

HEALTH SERVICES. Speech and hearing teachers were hired to increase speech and hearing therapy in Title I schools. Additional nurses and a clerk were added to increase nursing time provided at Title I schools.

COUNSELING PROJECTS. Five program activities provided additional professional or clerical personnel and materials to intensify counseling toward solving academic, mental, or social problems of pupils and parents.

AUXILIARY TEACHER SERVICES. After a pilot project, additional teachers were appointed to assist classroom teachers by: substituting for the regular teacher to permit small group instruction; lesson planning; providing remedial reading instruction to individual pupils or small groups; serving in the library; confering with parents; and assisting in school/parent/community activities.

TEACHER ASSISTANTS, AIDES, AND CLERKS. Assistants, aides, and clerks were provided in selected secondary and elementary target schools to relieve teachers of non-instructional classroom duties or clerical work and to permit more individualized instruction.

KINDERGARTEN AIDES. After a successful pilot project, parent helpers were employed as teacher aides to alleviate some of the problems of overcrowded classes in project schools. They helped to prepare instructional materials, to improve the classroom environment, and to supervise classroom and playground activities.

EXTENDED TIME AND TRAINING ACTIVITIES. Three program activities provided for orientation and in-service training of new teachers and for continuing professional advancement through conferences, courses, and workshops.

ADMINISTRATIVE SERVICES. Target schools have more office referrals by teachers and administrative transactions. Vice principals were appointed in target area elementary schools to strengthen administration and permit the principal to devote more attention to curriculum development.

CENTRAL OFFICE ACTIVITIES AND FACILITIES. Two projects were defined to provide for centralized district office services and facilities. One described capital outlay for remodeling, construction, or relocation of portable classrooms employed in projects described above. The other provided funds for administrative and support services of central offices which were necessary for the management, coordination, and evaluation of the overall CE program.

Other CE Activities

1963-64 PILOT PROJECT. A pilot project was initiated in 1963-64 in three elementary and two junior high schools to improve communication skills and motivation, to aid pupils in understanding their abilities, to strengthen teacher understanding of pupils' problems, to improve school relations with parents, and to provide pre-school experiences.

STATE CE PROJECT. In 1966-67, a state-district supported project was pursued in nine elementary and one secondary school to reduce pupil-teacher ratios and to obtain portable classrooms. A demonstration reading program was initiated in one junior high school.

NDEA COUNSELING PROJECT. During 1964-65 and 1965-66, a counseling project was supported in several secondary schools by NDEA funds to raise educational and vocational aspirations, to increase home-school contacts, and to motivate pupils to remain school. Activities included extended individual and group guidance sessions with pupils and a parent participation program.

Description of the Analysis

The approach pursued in this case study was designed in accordance with the type and volume of available program information and expenditure data. As defined at the district level, many CE "activities" actually were resource inputs to a CE project. It was necessary, therefore, to examine several sources of information such as project plans, activity descriptions, budget documents, and evaluation reports, in order to arrive at an operational description of a project at the school and grade level.

Financial records did not distinguish expenditures by schools. Special accounting for Title I funds employed resource categories (e.g., remedial reading teachers, teaching equipment) and school administrative divisions: elementary, secondary, student services, curriculum services, post high school, and overhead. The CE projects were subdivided by the district according to types of services provided: pre-kindergarten, remedial and corrective development, cultural enrichment, and auxiliary and supportive services. It was then necessary to define the CE activities pursued in a grade, to cumulate a catalog of resource inputs from several sources, and to estimate their costs. Use of district-wide cost factors was required, such as average teacher salaries and per-pupil expenditures for instructional materials or equipment. School and district personnel reports were a primary source of resource data.

A data form was designed on which to record information sought for subsequent regression analyses. This form permitted aggregation of information at three levels: all eligible schools, a particular school, and a selected grade. The following time periods were used as needed; the school years ending June 1965, 1966, and 1967; summer sessions 1965 and 1966. In addition, since Title I began in the middle of school year 1965-66, a separate time period, Spring 1966, was used for activities which occurred only in the latter half of that school year. The 26 CE activities identified in this study were then categorized into ten types of projects to permit comparisons on a basis more consistent with projects of other districts. They were:

1. Remedial reading and language arts
2. Other specific instructional projects (e.g., math, science)
3. Administrative changes, such as team teaching or modular scheduling
4. Vocation-related projects
5. Staffing increments not related to specific instructional projects

6. Non-instructional equipment and supplies
7. Staff development
8. Health and guidance services
9. Community-parent services
10. Cultural enrichment.

Finally, characteristics of staff, students and activity costs were included as follows:

1. Number of equivalent full-time teachers, by period
2. Number of direct pupil beneficiaries
3. Average size of participating pupil group
4. Average hours/week per participant
5. Weeks of project exposure per pupil
6. Instructional salaries
7. Other expenditures.

A brief description was prepared for each of the 26 CE activities and the data form was completed for each grade in the sample schools. An attempt was made to provide the required quantitative information at the lowest organizational level for which program information was available. When possible, these quantitative descriptions were based upon specific information at the grade level. When grade level data were lacking, school or district level information was used to allocate expenditures to grades, employing the following assumptions:

1. The number of children in a grade was defined as the total of pupils listed in active enrollment reports of that grade plus pupils in ungraded classes allocated to that grade by program coordinators.
2. Allocated staff positions were considered filled.
3. Services described at the school level were applied on a per pupil basis, as appropriate.
4. Budgeted amounts were used to estimate expenditures.
5. Information provided in CE program descriptions was accepted as describing the CE activities.

The allocation process revealed that many uncertainties still existed on the part of the authors with respect to information concerning services received, despite the fact that this district was chosen for having relatively complete records.

Illustration: Primary Remedial Reading

This illustration demonstrates the methods for estimating CE resources at the grade level for a specific activity. The particular case reflects the general observation that the actual application of CE resources varies widely among schools and grades in terms of absolute amounts of CE activities undertaken. Further, considerable variation also exists within a grade through time.

For a number of years prior to Title I, District 13 has conducted a remedial reading program for second and third grade "underachievers" of average or better ability. This program provides specially trained remedial reading teachers in all elementary schools. These teachers are assigned on a half-day, nine-week basis through the 36 week school year. They work with groups of 10 children for one period each day. These sessions are in addition to regular classroom work in reading. In theory, a child participates in the program for nine weeks, returns to his regular schedule for nine weeks, and then, if necessary, receives nine more weeks of remedial help.

With the addition of Title I funds, six remedial reading teachers were added to intensify existing services to eligible public and parochial schools. From February to June, 1966, this supplemental program was divided into three six-week sessions, serving grades 1-4. Pupil participants were selected by staff members of the schools. During the 1966-67 school year, a state-funded program provided additional teachers for this remedial reading program. These teachers were not assigned to target area schools, but to other schools in the district. To perform the required calculations, the following steps were taken and assumptions made:

1. Estimates of instructional staff were derived from district rosters of Primary Remedial Reading teachers. Each teacher is assigned to a school on a half-day (three periods or less) basis. Normally the school year is divided into four nine-week periods of instruction. Thus, it was assumed that staff were added in increments of one-eighth (one-fourth year x one-half day) of a Full-Time Equivalent (FTE) teacher.

However, the 18-week first semester of Title I was divided into 3 equal parts, which yields a FTE factor of one-twelfth (one-sixth year x one-half day).

2. Salary extimates were based on average regular teacher salary in 1965-66, $8,100.
3. Salary costs were apportioned on the basis of the number of pupil participants in a grade.
4. Other costs of the program were considered insignificant, as reported by the program director.
5. Pupil participation by grade and school was obtained from reports made by the teachers.

Table 35 contains the results of the above calculations for this CE activity in one sample school. It illustrates the amount and variations of CE resources among grades and time periods. Similar tabulations, not shown here, of grade level expenditures for other activities and schools indicate that similar variations often occur. One reason for these observed variations is the fact that, although some activities may apply equally to all eligible pupils, others apply only to certain pupils, grades or schools. Some activities continued at the same level with the initiation of Title I support; others expanded.

These variations were compounded by changes in the numbers of regular classroom teachers and in pupil enrollment. Examples of these variations are included in the following detailed studies of the CE activities and achievement changes of selected fifth and sixth grade cohorts of pupils.

Case Study of Sixth Grade Cohorts

Until the grade level descriptions are more fully verified, it is premature to examine in depth the relationship between CE inputs and pupil performance. However, it is possible to illustrate the types of comparisons that could be made by the following case study. In the study, summaries of CE expenditures were made for fifth and sixth grades in each of two schools where a sharp contrast in achievement test results was noted. The changes of mean achievement were as follows (1966-67 scores minus 1965-66 scores in Standard T units):*

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* The Reading subtest of the Stanford Achievement Test was used for the sixth grade and the Paragraph Meaning subtest of the Sequential Test of Educational Progress for the fifth grade.

Table 35. Estimated CE resources for primary remedial reading—School 3.

Time Period[a]	Grade	Full-Time Equivalent Teachers	Pupil Participants[b]	Estimated Expenditure[c]
1964-65	1	0	0	0
	2	0.2	21	$1300
	3	0.1	10	700
	4	0	0	0
1965-66[d]	1	0	0	0
	2	0.2	19	1300
	3	0.1	12	700
	4	0	0	0
1965-66 Title I period[e]	1	0.1	20	500
	2	0	0	0
	3	0	0	0
	4	0.0	10	200
1966-67	1	0.1	21	700
	2	0.2	31	2000
	3	0.3	30	2000
	4	0.1	10	700

Notes:

[a] Project not pursued during summer periods

[b] The activity was designed for groups of 10 pupils to receive 5 hours/day of remedial instruction for 2 alternate quarters/period. During the Title I portion of 1965-66 three 3-week classes were added, and in 1966-67 there was considerable irregularity in scheduling.

[c] Based on a constant average teacher salary. Other costs were considered negligible.

[d] Listed here are activities which extended throughout the academic year.

[e] Listed here are activities restricted to the special time periods established when Title I began in the spring of 1966.

Schools	Δ Mean Achievement Grades	
	5	6
5	-1.1	+1.2
7	-3.4	+5.7
Difference (School 5 minus School 7)	+2.3	-4.5

There are three observations which should be made with respect to this table:

1. At the sixth grade level, School 7 showed a considerable gain compared to School 5.
2. At the fifth grade level, both schools showed a decline in achievement, with School 7 showing a greater decline than School 5. The difference between the declines experienced by School 5 and School 7, however, is quite small.
3. Between the fifth and sixth grades a reversal of the relationship between School 5 and School 7 occurred. While at the fifth grade level, the difference between the schools is not large, the absolute total of the differences for both grades is substantial. However, it should be noted that the comparisons for 5th and 6th grades are not independent. The earlier fifth grade class in the 5th grade comparison is the later 6th class in the sixth grade comparison. Thus, an unusual early fifth grade class could, by itself, have accounted for the change in the direction of the relationship between the fifth and sixth grade classes. This lack of independence, while it affects the reliability of conclusions reached on this case study, nevertheless illustrates how CE expenditures can be compared with achievement test results. Other comparisons, such as the absolute magnitude of the changes, are not appropriate due to different test dates, test intervals, or test forms.

In developing estimates of resource inputs, the grades were viewed as cohorts, i.e., groups of pupils which receive a sequence of experience through time. The ideal cohort would have stable membership through time, but these groups did have changes of membership. For these comparisons, the 6th grade cohort refers to classes which move from grade to grade and were in the 6th grade when tested in respective years. Therefore, when considering a sixth grade cohort, the services received when this group was in the fifth grade must also be borne in mind.

Differences of CE services provided to the two cohorts were examined in the grade tested and in earlier years. The types of compensatory education activities provided to the sixth grade cohorts at Schools 5 and 7 are shown in Table 36. There were many activities serving both groups of sixth graders. However, for many of these there is no basis for differentiating between the experiences at the different schools; information was district wide and therefore presumably applied equally in the two schools.*

For this illustration, it was assumed that the types of compensatory education most likely to be related to reading achievement test scores are: (1) Remedial Reading and Language Arts, (2) Other Specific Instructional Programs, and (3) Staff Increments. Consequently, the analysis was restricted to these three types of CE activities; the specific activities of these types which were considered in this analysis appear in Table 37. The procedures used in combining expenditures are given below, and include the various assumptions which had to be made.

The following procedures were used in summing expenditures for 6th grade cohorts. The expenditures discussed are summarized in Table 37.

1. To make descriptions at the level of the district or the school applicable to particular grades it was necessary to allocate such services on a per pupil basis. Table 38 shows demographic characteristics of the successive 6th grades at Schools 5 and 7. For the purpose of comparing services in the elementary schools of different size, we assume no difference in per pupil level of service unless there is contrary evidence.
2. It is assumed that the CE services which occurred in the year preceding the achievement tests are those which have impact upon the achievement test scores. For the sixth grade the two sets of achievement test compared are those administered

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* Whether services were designed to be equal for all pupils or equal for all schools would make a difference. It was assumed that services were provided on a per pupil basis.

Table 36. CE activities serving sixth grade cohorts and levels of detail of available information.

CE Activity	Period of Services Provided						Level of Detail
	School 5			School 7			
	64-65	65-66	66-67	64-65	65-66	66-67	
English as Second Language	x	x	x				School
Educationally Handicapped		x		x	x	x	Grade
Reading Clinic						x	Grade
Audio-Visual Equipment		x	x		x	x	School
Improving Instruction in R&C Skills[a]		x	x		x	x	School
Facilities for Remediation		x	x		x	x	School
Classes for More Able					x	x	Grade
Library Services			x			x	School
Cultural Enrichment[a]		x	x		x	x	School
Central CE Services & Overhead[a]		x	x		x	x	District
Intensified Visiting Teacher Service	x	x	x	x	x	x	School
Guidance Clinic[a]		x	x		x	x	District
Additional Nursing Services	x	x	x	x	x	x	School
Auxiliary Teacher Services		x	x		x	x	School
Elementary School Administration Services		x	x		x	x	School
Teacher Assistants & Aides		x	x		x	x	School
Resource Help to New Teachers[a]		x	x		x	x	District
Additional Clerical Assistants		x	x		x	x	School
In-Service Education[a]		x	x		x	x	District
Curriculum Development[a]		x	x		x	x	District
State P/T Reduction Project			x			x	Grade

Note:

[a] Expenditures for these activities were assumed to be equivalent between sixth grade cohorts of 1966-67.

Table 37. Summary of CE expenditures for sixth grade cohorts.

CE Activities	School 5, Sixth Grade		School 7, Sixth Grade	
	1965-66	1966-67	1965-66	1966-67
English as a Second Language	$1500	$1500		
Reading Clinic				$1200
Educationally Handicapped		1600	$8100	8100
Classes for More Able				2400
Auxiliary Teacher Service		300		200
Elementary School Administration Service				a
Teacher Assistants and Aides		200		200
Additional Clerical Assistance		200		100
TOTALS	$1500	$3800	$8100	$12200
Estimated Number of Pupils Receiving Service	54	54	68	61
Expenditure Per Pupil	$28	$71	$119	$200
Difference Between Successive Cohorts	$43		$81	

Note:

[a] Negligible.

Table 38. Demographic characteristics of the sixth grades of Schools 5 and 7.

Characteristic	1965-66		1966-67	
	School 5	School 7	School 5	School 7
Number of regular & adjustment sixth graders (February)	46	62	45	58
Sixth grade pupils as percent of total enrollment	12%	8%	11%	8%
Sample size for achievement tests (January 1966 and October 1966)	34	62	42	62
Percent of sixth graders tested	74%	100%	93%	107%
Number of classroom teachers	1	1-1/2	1	1-1/2

in January 1966 and in October 1966. For the first test, the time interval for which to establish the level of service is from January 1965 to January 1966. This period includes no Title I expenditures. For the second test, the time of service is from October 1965 to October 1966. This period is the simpler to examine since it is approximately equal to academic year 1965-66 and the summer of 1966.* This includes the "first year" of Title I. Thus, the analysis consists of a comparison of the January 1966 scores of the cohort which was in the 6th grade in the 1965-66 school year with the October 1966 scores of the cohort which was in the 6th grade during the 1966-67 school year. Since each cohort was assumed to have been supported by CE programs during the year preceding the test, programs initiated after January 1966 were not considered as having affected the earlier cohort for purposes of the comparison, even though they were in fact applied to that cohort later in the school year.

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* For convenience, this assumption is made for all but the regular classroom teachers' salary, which is calculated more precisely.

3. Although English as a Second Language at School 5 was not funded by Title I in grade 6, this activity was expanded by Title I elsewhere in the district and is included in the analysis. The rate of expenditure was the same at School 5 for the past several years. The service for the sixth grade cohort was estimated as approximately 15 percent of the service given to the school.* Even though average teachers' salary changed over years, a constant 1965-66 salary level was used for each year to prevent variation due to cost of the service rather than quality or amount (Reference 9).

4. For the Educationally Handicapped and Adjustment classes at School 5, there was no service prior to January 1966. Thus, there were no expenditures for the earlier cohort. For the later sixth grade cohort, there was no service at the sixth grade level in 1966-67. There was, however, service to that same group during the last half of the preceding school year, when that cohort was in the fifth grade. This service consisted of a class of 18 pupils drawn from the fourth through sixth grades. More exact information about participation was not obtained. Therefore, one-third share of the expenditure for this service was assigned to the later 6th grade cohort. At School 7, the same level of service existed for the fifth grades in 1964-65 and 1965-66. Therefore each cohort received the same amount of service.

5. In School 7, Classes for the More Able were begun in February 1966. Therefore, this service was not considered to apply to the earlier sixth grade cohort; the service for the later sixth grade cohort was that received during the Title I period of 1965-66 by the fifth grade. School 5 did not have this service.

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* More precise estimates of the amount of service to the later and earlier cohorts would be the proportion of the total school which was in the fifth grade in 1965-66 and the average of the fifth grade in 1965-66 and the sixth grade in 1965-66. These estimates, based on February enrollment figures, would be 14 percent and 13 percent respectively. Because it is not known whether special classes or kindergarten classes were eligible for this program, an approximate figure constant for all cohorts, was used in the present illustrative calculations.

6. The Auxiliary Teachers Service, which began in February 1966, was considered to apply only to the later sixth grade cohort of each school. Each school had a half-time auxiliary teacher. The share of the cost which applies to the 6th grade cohorts would be about 12 percent for School 5 and 8 percent for School 7, based upon the percentage which the 6th grade constitutes of the school.
7. For Teacher Assistants and Aides who were assigned on a per-school basis, the appropriate percentages that each sixth grade was of the total school were applied to obtain an allocation for the sixth grade cohorts. For School 7, information about teacher assistants in 1965-66 had not been received by the time this analysis was performed so that the assumption that there were no services in that time period is questionable. The services from teacher assistants and from aides were added together.
8. For Additional Clerical Assistants, the same proportions were used to allocate service to the sixth grades. The difference in level of service favoring School 5 results because School 5 is a smaller school and it was assumed that there was more per pupil benefit for a given level of service at the smaller school.
9. The state project to reduce pupil-teacher ratio began in 1966-67, and did not directly provide a sixth grade teacher.*
10. The amount for Elementary School Administrative Services was negligible for the 1966-67 sixth grade cohort at School 7, the only school to which it applied.

The primary interest with respect to the expenditures of CE funds is the change in expenditures per pupil through time. Based on the above assumptions, the amounts expended in the schools in the year prior to the achievement tests were computed and are shown in Table 37. To determine the expenditures per pupil, it was necessary to determine the appropriate number of pupils serviced; this was performed as follows. For the earlier cohort, the average of (1) enrollment in the regular, Educationally Handicapped (EH) and Adjustment 5th grade classes in 1964-65 and (2) enrollment in regular, EH, and Adjustment sixth grades in 1965-66 was used. For the later cohort, enrollment in regular, EH and Adjustment fifth grade classes in 1965-66 was accepted. The number of pupils serviced is shown in Table 39, and the cost per pupil for each cohort is shown in Table 37. The level of CE services, as represented by expenditures per pupil, rose almost twice as much for the 6th grade cohort of School 7 between 1965-66 and 1966-67 ($81 per pupil) as it did for the same cohort at School 5 ($43 per pupil).

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* One teacher at School 7 was actually paid from state compensatory education funds. Since the project concerned was aimed at reducing pupil-teacher ratio in a range of grades, the particular grade assignment is incidental, for accounting purposes. It is more reasonable to regard the proportion of all teachers supported by CE funds as the level of CE services. This would amount to 20 percent in School 7 and 10 percent in School 5 in 1966-67. To simplify the presentation, this CE project is included in Regular Classroom Teacher Services.

Any comparison of services to pupils provided by different schools would be incomplete if it were restricted to CE programs and failed to consider possible differences in regular classroom instruction furnished by those schools. In order to provide for the support furnished by regular classroom teachers, it was necessary to cost their services for the relevant time period, i.e., the year preceding the two achievement tests. Since this service represented a larger sum of money than was involved in the CE program, the approximations of the support period used for the CE programs were considered too gross, and a more precise period was employed. In order to coincide with the support periods for January 1966 and October 1966 test dates, the time periods used were:

Earlier cohorts:	1/2 fifth grade 1964-65 academic year + 1/2 sixth grade 1965-66 academic year
Later cohorts:	8/9 fifth grade 1965-66 academic year + 1/9 sixth grade 1966-67 academic year

The number of teachers at each grade level each year was:

	School 5			School 7		
	1964-65	1965-66	1966-67	1964-65	1965-66	1966-67
Grade 5	1-1/2*	1-1/2	1-1/2	2	2	2-1/2
Grade 6	1	1	1	1-1/2	1-1/2	1-1/2

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* Fractional teachers arise when pupils from two grades are assigned to a teacher.

Table 39. Regular classroom teacher expenditure for sixth grade cohorts.

	School 5		School 7	
	Sixth Grade in 1965-66	Sixth Grade in 1966-67	Sixth Grade in 1965-66	Sixth Grade in 1966-67
Teacher salary per cohort in year preceding achivement tests	$10,100	$11,650	$14,150	$15,744
Estimated number of pupils in cohort when receiving service[a]	(24 + 30)	54	(32 + 36)	61
Teacher salary per pupil	$187	$216	$208	$258
Difference between successive years (1966-67 — 1965-66)	$29		$50	
Difference between schools	$21			

Note:

[a] For 1966-67, the enrollment of the sixth grade cohort is: fifth grade regular and adjustment pupils in February 1966. For 1965-66, the enrollment of the sixth grade cohort is: 1/2 (sixth grade regular and adjustment pupils in October 1965) plus 1/2 (fifth grade regular and adjustment pupils in March 1965). The grade distribution of Adjustment classes provided by Exceptional Child Services Office was generally accepted, and applied to the enrollment found in the Reports of Active Enrollment.

The cost of teacher services was priced at the average elementary school teacher salary in 1965-66, $8,100.

The calculations of teacher service for the 6th grade cohorts were:

School 5 in 1965-66 — $1/2 \times 12100 + 1/2 \times 8100 = \$10,100$

School 7 in 1965-66 — $1/2 \times 16200 + 1/2 \times 12100 = \$14,150$

School 5 in 1966-67 — $8/9 \times 12100 + 1/9 \times 8100 = \$11,650$

School 7 in 1966-67 — $8/9 \times 16200 + 1/9 \times 12100 = \$15,744$

The increasing amount of service for the later cohort is due to the greater amount of time spent at the 5th grade level, which has a greater amount of teacher service.

The calculations of expenditures per pupil are shown in Table 39. The greater increase in regular classroom expenditures per pupil for School 7 is due to the decrease in the number of pupils in the cohort.

Table 40 summarizes the expenditures per pupil for CE and classroom teacher salary. In both amounts of expenditures per pupil and increases over the preceding year, School 7 pupils are faring much better than those in School 5. These results are particularly interesting because they are consistent with achievement results described earlier in this section.

Case Study of Fifth Grade Cohorts

A similar analysis was made for grade 5 of the same schools. In this comparison, a different time interval for the CE service for the earlier cohorts is involved since testing occurred in October in successive years. Thus, the appropriate support period for the earlier cohorts extends from October 1964 to October 1965, and that for the later cohorts from October 1965 to October 1966. As for the sixth grade comparisons, these time intervals were considered to include the academic year and summer of 1964-65 and 1965-66, respectively.

Differences in CE expenditures between fifth and sixth grade cohorts occurred for only one activity. For the Educationally Handicapped (EH)

Table 40. Expenditures per pupil for sixth grade cohorts.

	School 5		School 7	
	1965-66 Cohort	1966-67 Cohort	1965-66 Cohort	1966-67 Cohort
CE Activities	$ 28	$ 71	$119	$200
Regular Classroom Teacher Salary	$187	$216	$208	$258
TOTAL	$215	$287	$327	$458
Difference Between Successive Cohorts	$72		$131	

activity, the level of service to the fourth grade in School 7 was less than that received by the 5th grade. * (See Table 41.)

To convert the amount expended for a cohort to a per pupil level of service, the enrollment of regular, EH, and Adjustment classes at the fourth grade level of the preceding year was taken as the size of the cohort receiving service.

The level of CE service increased at each school for successive cohorts. As was true for the sixth grade, the increase for the fifth grade cohort was greater at School 7 than School 5. The difference, however, is only about a third as great as it was for the sixth grade.

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* There is also a shift in level of service between 1965-66 and 1966-67. Taking into account about 1/9 of a year (for the service in 1966-67) at half the level of expenditure would result in increase of about $450 to the 1965-66 total at School 7. Similarly, for the sixth grade making this alteration in time intervals would result in a subtraction of the level of service to the 1966-67 sixth grade cohort at School 7 of $450. In neither case does this correction alter results appreciably.

Table 41. CE expenditures for sixth grade cohorts at Schools 5 and 7.

CE Activities	School 5, Fifth Grade		School 7, Fifth Grade	
	1965-66 Cohort	1966-67 Cohort	1965-66 Cohort	1966-67 Cohort
English as a Second Language	$1,500	$1,500		
Reading Clinic				$1,200
Educationally Handicapped		1,600	$4,000	4,000
Classes for More Able				2,400
Auxiliary Teacher Service		300		200
Elem. School Admin. Service				a
Teacher Assistants and Aides		200		200
Add. Clerical Assistance		200		100
TOTALS	$1,500	$3,800	$4,000	$8,100
Est. No. pupils in cohort when receiving services	58	68	69	79
Expenditure per pupil	$26	$56	$58	$103
Difference between successive cohorts	$30		$45	
Difference between schools	$15			

Note:

[a] Negligible.

As in the case of the sixth grade cohorts, the costing of regular classroom teachers was based on the one year supporting period prior to the date of the achievement test. Since achievement tests were given in October, the support period consisted of eight months of the preceding school year and only one month (September) of the school year in which the test occurred. The time periods used were:

Earlier cohort:	8/9 fourth grade services in the 1964-65 academic year + 1/9 of fifth grade services in the 1965-66 academic year.
Later cohort:	8/9 fourth grade services in the 1965-66 academic year + 1/9 of fifth grade services in the 1966-67 academic year.

Levels of teacher service varied, in number of teachers assigned per grade level, as follows:

	School 5			School 7		
	1964-65	1965-66	1966-67	1964-65	1965-66	1966-67
Grade 4	1	1-1/2	1-1/2	2	2	3
Grade 5	1-1/2	1-1/2	1-1/2	2	2	2-1/2*

Using the average teacher salary of $8,100, regular teacher service for the four fifth grade schools was as follows:

School 5 in 1965-66 — 8/9 x 8100 + 1/9 x 12100 = $8,544

School 7 in 1965-66 — 8/9 x 16200 + 1/9 x 16200 = $16,200

School 5 in 1966-67 — 8/9 x 12100 + 1/9 x 12100 = $12,100

School 7 in 1966-67 — 8/9 x 16200 + 1/9 x 20200 = $16,644

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* One teacher at School 7 was actually paid from state compensatory education funds. Since the project concerned was aimed at reducing pupil-teacher ratio in a range of grades, the particular grade assignment is incidental, for accounting purposes. It is more reasonable to regard the proportion of all teachers supported by CE funds as the level of CE services. This would amount to 20 percent in School 7 and 10 percent in School 5 in 1966-67. To simplify the presentation, this CE project is included in Regular Classroom Teacher Services.

There is an increasing amount of service at each school, but when the increases in pupil enrollment are considered there is a sharp contrast in changes in expenditures per pupil: School 5 rises and School 7 drops. (See Table 42.)

When the change in expenditures per pupil for regular classroom teachers is combined with the change from compensatory education, School 5 is seen to have an increase in expenditures per pupil of $61, while School 7 has an increase of $21. (See Table 43.) This contrast in favor of the fifth grade cohort at School 5 is also consistent with the achievement test results.

Summary of District 13 Case Study

This case study concerned itself with two sets of cohorts—cohorts in the fifth grade in both the 1965-66 and 1966-67 school years and cohorts in the sixth grade in the same two school years. Two schools were included in the analysis. For each set of cohorts, a comparison was made between changes in achievement test scores over the two years and changes in the amounts of selected resources per pupil expended on the two cohorts. The expenditures used included estimates of both funds expended explicitly for selected CE projects and those for regular classroom instruction for the year immediately preceding the test date, since it was assumed that the test scores should reflect the services provided during that period.

The case study results showed that

1. For the sixth grade cohorts, increases in expenditures per pupil at School 7 were greater than at School 5. Similarly, increases in achievement test scores at School 7 were greater than at School 5.
2. For the fifth grade cohorts, the relationships between School 5 and 7 are reversed. Achievement changes now tend to favor School 5, although the difference is small. Similarly, the increase in expenditures per pupil was greater at School 5 than it was at School 7.
3. Although the difference between the changes in achievement scores for the fifth grade cohort at School 5 and School 7 was small, it represents a substantial reversal of the relationship which existed between the two schools for the sixth grade cohorts. It should be borne in mind, however, that the two cohorts were not independent, and thus this reversal might well have been the result of the unusual performance of the cohort common to both grades.

Table 42. Regular classroom teacher expenditure for the fifth grade cohorts at Schools 5 and 7.

	School 5		School 7	
	1965-66 Cohort	1966-67 Cohort	1965-66 Cohort	1966-67 Cohort
Teacher salary per cohort in year preceding achievement tests	$8,544	$12,100	$16,200	$16,644
Est. no. of pupils in cohort when receiving service	58	68	69	79
Teacher salary per pupil	147	178	235	211
Difference between successive years (1966-67 — 1965-66)	+$31		-$24	
Difference between schools	$55			

Table 43. Expenditures per pupil for fifth grade cohorts.

	School 5		School 7	
	1965-66 Cohort	1966-67 Cohort	1965-66 Cohort	1966-67 Cohort
CE Activities	$ 26	$ 56	$ 58	$ 103
Regular Classroom Teacher Salary	147	178	235	211
TOTAL	$ 173	$ 234	$ 293	$ 314
Difference between successive cohorts	$61		$21	

Approximately 12 man-weeks of effort was required to pursue this case study. This effort is probably representative of the time and manpower required to develop CE resource descriptions for school districts for which expenditures are not reported by school and grade. In the case study just described, the number and nature of the assumptions required to allocate resources by grade and project were such that additional analysis and verification is certainly required. To do this would require revisiting District 13 for a period of at least one week.

CONCLUSIONS FROM THE CASE STUDIES

Compensatory education programs of two school districts have been examined in detail in order to determine the feasibility of identifying problems in and defining the effort required for describing CE program activities and estimating the expenditures of resources at grade level, so that they might be compared with measures of pupil performance.

Different analytical approaches were required because of differences in data obtained from school districts. In one case, district level CE project information was combined with expenditure data by school and project to make estimates of project expenditures by grade. In the other, such information was not available by schools, and specific detailed information had to be obtained for each kind of activity at the school and grade level. In each case study, wide variations of services were found among schools and grades. The need for extensive information on projects and activities was confirmed. In each analysis, the assumptions and interpretations were such that the estimates derived should be used with caution until verified to the extent possible by personnel in the school districts.

To illustrate the use of these resource estimates, selected comparisons were made with measures of pupil performance. In one district, no relationship was found between changes in expenditures for regular or CE project activities and achievement test changes. In the other district, an apparent relationship was found between changes in educational services and achievement scores for a small number of grades and schools.

No firm conclusions should be drawn about the relationships of CE services and performance measures from these limited examinations. The variations of services received among grade units and of achievement measures suggest that it will be necessary to seek resource-performance relationships at the grade level. Further, the complexity of data on CE programs and expenditures and the difficulty in obtaining the required information indicate that such analyses will require much effort in data gathering and analysis.

The year-to-year variation in regular school program expenditures per pupil was found to be greater than the amount of expenditures for CE. This suggests that both types of expenditures should be considered in the evaluation of the contribution of Title I funds towards enhancement of achievement.

SECTION 4

OBSERVATIONS, CONCLUSIONS, AND RECOMMENDATIONS

The primary objective of this study is to provide answers to the following questions:

1. Has significant enhancement of pupil performance resulted to date from CE programs?
2. What schools, pupil and environmental characteristics are associated with enhanced pupil performance?
3. What are the distinguishing features of successful CE programs?

Section 2 describes the analysis performed to answer questions 1 and 2. Section 3 describes the work accomplished in the first step for developing answers to question 3.

The knowledge gained and experience encountered during the study have made it possible to make certain observations which are relevant in evaluation of programs to improve education. These observations are made in the first part of this section. In the second part, specific conclusions with regard to the basic objectives of this study are presented. Only partial answers can be given at this time to the first two questions, and except for analysis of level of expenditures, the third question has not yet been addressed. Although conclusions from Phase I are tentative, they provide some insights into the ultimate answers to the above questions. Further, they provide guidance concerning fruitful directions that future research might take.

Finally, the last part of this section contains recommendations, based on the Phase I effort, which it is hoped will prove helpful to DHEW and other interested organizations.

GENERAL OBSERVATIONS

The following observations were developed during field trips and discussions with officials concerned with Title I programs. The large number of field trips provided an opportunity to learn about the students who are the prime target for CE, the school programs, and the views of local school officials.

Pupils Affected by Compensatory Education Programs

It was observed that although some CE programs are designed to benefit all pupils in Title I schools, many compensatory education programs are directed towards the most severely disadvantaged pupils within each school and grade. This observation is illustrated by CE project descriptions in Section 3 and appears to be supported by the statistical analyses of changes in achievement .

This concentration of CE services raises a fundamental question about the stated objectives of Title I, ESEA. Within the target schools selected in the sample, a large percentage of pupils in each school are "educationally deprived." It appears that "educationally deprived" pupils who do not happen to rank at lower achievement levels in their respective schools are not receiving the same amounts of CE services as pupils who rank at the lower levels. This might mean that, within the stated objectives of Title I, many programs are not yielding maximum possible benefits.

If the performance of the lowest achievers increases in proportion to the CE program funds provided for these students, the concentration of funds at the lower end of the distribution might be defensible. If, however, diminishing returns occur (i.e., if achievement gains decline for constant increases in CE program resources), then the policy of concentrating the CE program funds on these lowest achievers may be an inefficient way to spend such funds.

It was not possible in Phase I to study the possibility of diminishing returns because of the very limited data on expenditures per pupil. An effort that would include obtaining regular program expenditures as well as expenditures for specific types of CE would likely provide a range of expenditures per pupil that would be a basis for determining the level at which diminishing returns begin.

Pupil Mobility

Officials in many of the sample school districts report that a high rate of pupil mobility exists in the inner city schools. This has been verified to a large extent by the statistics accumulated to date in this study. Where this problem is found to be serious, it may be necessary to take explicit account of it either in HEW programs or independently by the recipient states.

Possible problems created by this high mobility rate are easy to visualize. If a severely disadvantaged child changes schools during the school year, it is quite likely that the CE resources expended to upgrade him will not have been utilized in an efficient manner, under present administrative procedures. Schools attended during the year may have different types of programs, different criteria as to pupils who are eligible for help, and different diagnoses of particular student problems.

Evaluation of CE at the Local Level

All of the school districts visited have designated personnel responsible for evaluating the effectiveness of educational programs in their districts. Some of these positions are relatively new, perhaps the direct result of OE or State interest in evaluation, or ESEA requirements. This should be viewed as a very beneficial impact of ESEA upon future educational programs.

Schools, however, are primarily concerned with the day-to-day education of their students; they are only secondarily concerned, if at all, with the conduct of rigorous educational research. Yet, if effective CE programs are to be identified and if ineffective programs are to be eliminated, some research sophistication must be introduced. Studies must be designed from the beginning, to allow conclusions to be drawn without the need for the massive data manipulation required in this study. Care must be taken to state very specific objectives of an educational program and, whether or not it is a CE program, studies should be performed as experiments in which variables and conditions are carefully controlled. Considerable effort is required to improve data reporting and recording, so as to make definitive analyses possible. The types of assumptions and interpretations required to obtain the basic data of this study are inefficient and so complex that they may easily yield inaccurate information.

Difference among School Records

The degree to which school districts observe recommended guidelines for records keeping was observed to vary widely. Frequent differences of definitions were found, causing additional difficulties in obtaining data for comparisons of pupil performance and comparisons of expenditure levels for CE programs among the school districts visited. For example, some districts considered an excused absence as "present" for attendance records, others did not. Some computed pupil mobility for the school year, others for the calendar year. Records of pupil "drop-outs" employed different categories. The occurrence of ungraded schools required extra care to identify the imputed grade level of pupils, especially for the purpose of analyzing achievement test scores. Differences in definitions and forms of records require considerable extra effort in evaluation of programs such as Title I. As in this study, data can be adjusted to be comparable but it is probable that these adjustments reduce precision of the statistical measures. Sometimes the desired data are not available and approximations had to be accepted, e.g., the substitution of enrollment for ADM data.

Definitions of and Cost Accounting for CE Programs

Many of the school districts visited defined some of their CE projects in terms which complicate or hamper efforts to evaluate the true cost of the project. Some projects were defined in terms of activities or objectives, others as resource inputs. For example several "projects" were defined in terms of resources such as teacher aides, community counselors, resource teachers, and instructional materials centers. These "project" definitions permit simple accounting of funds but complicate identification of the full measure of resources employed.

Financial records are seldom kept by school or project, and available budget and expenditure records vary in form and level of detail. The treatment of resource inputs as separate projects tends to hamper evaluation by fragmenting the district CE program, by adding unnecessary complexity, and by obscuring a portion of resources allocated to a project. Much effort is required to "redefine" CE projects in such a way as to clarify the appropriate measure of performance (i.e., the objective) and to identify all of the input resources.

Relating Title I Expenditures per Pupil to Changes in Achievement

Although achievement test data are kept by school and grade, expenditures of Title I funds cannot be easily correlated with the achievement test results. Many school districts have test scores for individual pupils identified by name of pupil and the school in which he was enrolled but they do not have means to identify the amount of CE the individual pupils received. In some cases the test scores are in the form of frequency functions identified only by school in which pupils were enrolled. In this case, even if CE could be identified for specific pupils it could not be correlated with achievement test scores.

Since most types of CE programs are usually oriented to only a small percentage of the entire pupil population in Title I designated schools the records currently being kept do not permit easy and precise evaluation of the effectiveness of CE programs.

If schools receiving CE funds (1) would provide descriptions of present and past CE projects and (2) provide a code along with each pupil test score identifying CE programs in which the pupil had participated the school district would have a wealth of information. Most schools would have less than 10 CE projects in the entire school and a simple code could be used to identify the CE programs on the test record.

Year-to-Year Variation in Test Scores

There is a large year-to-year variation in mean test score for specific grades within a school. The variation is much larger than what would be expected from analyses of variation among pupil scores within a grade in a specific year.

In the entire sample the standard deviation of the difference in mean scores between two years was approximately twice as great as would be expected based on the standard deviation of test scores within each year. This means that there is a large year-to-year variation in test scores caused by such factors as quality of instruction and conditions under which test is given. In essence, the difference in test scores for the same grade in a school in two different years appears to depend as much on differences in testing and quality of instruction as it does on differences in pupils.

One of the causes of difference between 1965-66 and 1966-67 was CE but this cannot, of course, account for both negative and positive changes. The sample statistics used in this study suggest that on the average CE accounts for only a small part of the variation between the two years.

CONCLUSIONS

There are a number of conclusions that may be drawn from the study thus far. However, it is necessary to recognize that these are tentative conclusions and subject to some degree of uncertainty because average change in achievement scores were found to be small and sampling variation was large. Since Title I, ESEA, had been in effect for a maximum of 1-1/2 years in the schools included in the study, it was expected that whatever benefits had accrued from Title I would probably be small. Moreover, the actual period of CE exposure between 1965-66 and 1966-67 achievement tests for most students in this sample was less than one year. In addition, it was expected that sampling variation would be relatively large, due to uncontrolled factors that could cause significant differences in test results.

Conclusions from the analyses in Section 2 are based upon results which—although statistically meaningful within the restrictive context necessarily created—involve rather small numerical values. The average change in test scores measured in grade equivalence was less than 1 month. Hence it is possible that changes in achievement levels which seem to indicate a positive effect from Title I could be attributable to sampling variation arising from uncontrolled environmental factors. On the other hand, a general downward trend in achievement at inner-city schools, if it exists, could understate the amount of enhancement produced by CE programs.

Thus, to make an analogy with physical science the problem was one of "detecting a weak signal in the presence of noise." When the statistical laws governing the noise are not completely known it is not possible to give very precise estimates of the amount of signal. To continue with the analogy, the problem is compounded by the fact that the instruments being used to measure the signal (i.e., standardized tests, in this case) are known to be imperfect in calibration.

The analyses described in previous Sections and the conclusions summarized below represents the best estimate of the situation based on the data that could be accumulated for this study. The following conclusions are useful not only as substantive findings, but as indicators of areas where further work would provide additional confirmation of findings.

1. Compensatory Education programs seem to have enhanced the achievement of the students in the lowest part of their classes.* Although the performance of these students actually increased by only a modest amount between 1965-66 and 1966-67, there is reason to believe (see number 4 below) that they would have done considerably worse in the absence of CE programs. (See pages 27-30.)

2. The most favorable changes between 1965-66 and 1966-67 were in those school districts which had the largest average expenditures of Title I funds per pupil. Statistical analyses shows a positive correlation between change in test scores and amount of Title I expenditures. (See Tables 12 and 24.)

3. There appears to be a decline in mean pupil achievement levels in the Title I schools. This conclusion was based on averages taken over 314 school-grades in 11 different school districts. (See page 27 and Table 6.)

4. The year-to-year variation in mean achievement scores is so great that it was necessary to base conclusions on average change for several schools and several grades. This makes it difficult to interpret the importance of changes in scores. The most frequently observed change for individual grades was approximately two months expressed in grade equivalence. (See Appendix A and Figure 8.) At the first decile positive changes were more frequent than negative, but for the mean the reverse was true. The average change at the first decile was an increase in the neighborhood of one-fourth month in grade equivalence and for the mean the average change was a decrease in the neighborhood of one-half month in grade equivalence. (See Tables 6 and 7.)

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* Enhancement is defined as a higher achievement level than would have existed if there had been no CE programs. See Section 2, page 27.

5. Year-to-year changes in regular program expenditures for specific grades in a school often exceeds the funds available from Title I. This makes it important to compare changes in achievement with expenditures from both regular and CE programs. (See, for example, Table 29 and Figure 11.)

6. The changes in attendance between the two years were not significant. There appears to have been several factors contributing to changes in attendance but these causes were unrelated to CE programs. (See page 26.)

7. Changes in achievement between 1965-66 and 1966-67 were related to the proportion of Negro students in a school. Those schools having less than 20 percent Negro student population did significantly better than the schools having a higher proportion of Negroes. Moreover, this relationship was similar in all school districts. The schools in the 40-60% Negro range (1965-66) showed the most negative change between 1965-66 and 1966-67. (See page 50 and Table 18.)

   Although changes in achievement were related to percent Negro pupils there is no apparent relationship between changes in achievement and changes in percent Negro. (See page 54.)

8. The degree of enhancement seems to be related to the initial achievement levels of a grade school (i.e., prior to CEP); that is, the greatest improvement came from the school grades with lowest mean achievement in 1965-66. The observation does not take into account variations in the level of funding for CE programs, thus, the relationship might be due to the poorer schools having the highest intensity programs. (See pages 54 and 56.)

9. The eleven school districts did not change uniformly in mean achievement level between 1965-66 and 1966-67. One district showed some significant improvement and two districts showed significant declines. Observed changes in each of the other districts were not significantly different from zero. (See page 32 and Table 9.)

10. No strong relationships were observed between changes in achievement and poverty level, mobility, percent Spanish speaking population, or size of school (ADM). However, it was difficult to obtain adequate measures of poverty and mobility because of varying definitions employed by the several school districts. The validity of standardized achievement tests is uncertain when the tests are given to pupils whose native language is not English and this abscures analysis of the relationship between percent Spanish and changes in achievement. (See page 54.)

11. Despite the lack of significance in the mobility and attendance regression coefficients, the consistency of their signs suggests an area for further study. With only a few exceptions, the mobility coefficients were negative (i. e., indicating a possible inverse relationship between mobility and achievement changes) and the attendance coefficients were positive (i. e., indicating a possible direct relationship between attendance and achievement changes). (See Tables 14 and 15.)

12. Responses to CE were not uniform among grades within a school. Most schools had some grades in which achievement increased between 1965-66 and 1966-67 and some grades which declined. This suggests that subsequent analyses should obtain and analyze data by grade level rather than using statistics on averages for the entire school. (See pages 37-38 and 86-89.)

13. No consistent relationship was found between grade level and changes in achievement prior to and after exposure to CE. Negative and positive changes occurred at both lower and higher grade levels. (See Tables 16 and 17.) Also, the residuals from the regression equations were not related to grade level. That is, the variation in achievement that cannot be explained by the variables in the regression equations is not related to grade level. (See page 45.)

14. From examinations of CE activities at the grade level in districts 10 and 13 wide variations among and within schools and grade levels were found in expenditures per pupil (both CE programs and regular classroom instruction) and in types of CE activities. Determination, by activity, of CE services provided at the grade level was found to be feasible but time consuming due to the complexity of programs and the nature of school district records and accounts. (See pages 120 and 121.)

15. In District 10 sample schools no relationships were discovered between change of reading test scores and type of CE activity or level of expenditure. There was little reason to expect substantial change in view of the small amounts of pupil exposure to CE prior to the post test. (See Table 31 and Figure 11.) In District 13 a positive relationship was observed between change in achievement scores and educational expenditures in two grades in two schools. (See pages 103 and 105, and 118.)

The number of pupils in each of the 314 grades observed in this study varied from 16 to 598. Since one expects the mean score of a large class to have less sampling variation than the mean score for a small class two different types of averages were computed. One was a simple average of the observed changes and the other was a weighted average based on the number of pupils in each grade. In general the weighted averages tend to confirm the conclusions that can be drawn from the simple averages. The confidence level for conclusions on the negative change in the mean and quartiles is, however, somewhat higher in the case of weighted averages.

There appears to have been many causes of the changes in achievement scores in sample schools between 1965-66 and 1966-67. The five state and CE program variables included in the regression equations appear to explain only about 25 percent of the variation in changes in achievement. Since the only available measure of funding for CE was very crude it is possible that better data on CE program variables will explain considerably more of the year-to-year variation. On the other hand, there were many negative changes between 1965-66 and 1966-67 that are undoubtedly caused by other than CE program variables.

It is very difficult to determine the results that should be expected at this time from the first two years of Title I. However, judgements on expected results must be made in order to make decisions on future Title I expenditures.

Although it can be costly to continue programs that yield small returns it can also be costly to not encourage programs that are yielding returns. It can also be costly to not experiment with programs a sufficiently long time to obtain a firm evaluation.

The conclusions in this report are presented as an objective analysis of available data. They do not present strong evidence of substantial enhancement but they surely do not support the hypothesis of no positive effect on enhancement. The tentative conclusion from this study is that Title I funding has increased the amount of CE for disadvantaged pupils and that the achievement level of pupils who have been exposed to this increased CE has been enhanced.

RECOMMENDATIONS

The first and second recommendations are concerned with research projects that will give more definitive answers to the three questions posed at the beginning of this research effort. The third is concerned with long-term efforts to improve evaluation of educational programs. The fourth is concerned with data reporting schemes for recipients of Titie I funds.

Further Analysis of Study Objectives

It must be kept in mind that the three questions posed at the beginning of this study do not cover all relevant questions concerning Title I. For instance they do not include questions on the cost-benefit ratio of CE programs, rate of increase in achievement as expenditures are increased, or the relationship between achievement in reading and the overall value of education to the individual. These are important questions, but they were beyond the scope of the present overall study and will not be considered in these recommendations.

Among the 314 observations in the sample there are several that indicate there might have been substantial increase in achievement from CE. However, before selecting or rejecting observations on some criterion of success, the following factors should be considered: first, the relation between the measure of success and the focus of the specific CE programs; second changes in funding of programs not funded from Title I but which coincided with Title I; third, the portion of the pupils in each observed grade that were the prime target of the CE program; fourth, the period of exposure to CE in relation to the time achievement tests were given. It is recommended that follow-on research efforts, oriented towards identifying distinquishing features of successful CE, be designed to collect data on all four of the above aspects.

On the question of whether significant enhancement has resulted to date from CEP there are two major aspects that require further study. Further studies should be oriented toward determining if there is a significant downward trend in achievement levels in schools typical of those now receiving Title I funding. Second, data on the sample schools must be analyzed to determine which pupils in these schools actually received CE. Case studies of two school districts, presented in Section 3, reveal many instances in which CE projects were oriented to only a very small percentage of pupils in a school.

On the question of what school, pupil and environmental factors are associated with enhanced pupil performance, further studies should focus on collecting and analyzing information on the specific pupils receiving CE. The Phase I study collected considerable information on schools, some information on individual grades, and practically no information on specific pupils. For example, information on the mobility rate for the entire school might be a poor estimate of the mobility of the most disadvantaged pupils.

Further analysis should concentrate on two aspects of the question, namely, what characteristics are associated with local school districts' allocation of CE funds and what characteristics are associated with success per dollar of expenditure.

Longitudinal Studies

This study did not utilize the method of measuring the progress of individual students during exposure to specific CE programs, i.e., the longitudinal approach. Such a procedure has great merit if time and data are available. TEMPO recommends that DHEW initiate a project that would apply the longitudinal approach to the problem of evaluation of CEP. It could attempt to utilize existing data but probably would need to obtain further information covering longer time periods. Because of the comprehensive data collection and analysis task required, this study should focus on a few CE groups rather than a large-scale population group.

Non-Profit Educational Research and Evaluation Organization

All of the school districts have created positions for research personnel for evaluation of special programs. However, in general, it has been exceedingly difficult for these groups to attract the type of analytical talent necessary to design the necessary information systems, to perform the analytical work and to recommend improved teaching methods based on such analyses. One reason for this recruiting difficulty is the growing demand for such analysts throughout industry and government. It is unlikely that this demand will be met satisfactorily for many years. A supplement (and possibly an alternative) to individual evaluation groups in each of the school districts throughout the country is needed. No attempt will be made to review the proposals that have been made to deal with this educational evaluation problem. Instead, this report will simply add one more proposal to the growing list of alternatives.

It is the view of this contractor that a non-profit Educational Research and Evaluation Organization is needed and would be attractive to the kinds of analysts required. Because of the desire on the part of the school districts to preserve their independence, direct control and total financial support by the U.S. Department of Health, Education and Welfare might be undesirable. Although DHEW should take the lead in helping to establish such an institution, it might be best for the states and school districts to support it financially. General research into innovative teaching methods and evaluation could be made available to all member jurisdictions and states or districts could request help in testing new techniques or in evaluating various local programs. This institution could also help member jurisdictions in the design of information systems and thereby encourage the development of some degree of standardization among the jurisdictions without involving DHEW. The Board of Directors should consist of representatives from States, Local School Districts, Universities, Industry and DHEW.

Other arrangements are feasible and might be at least as productive as the one suggested here. For example, an existing organization (such as the Educational Testing Service) might be encouraged to assume the role of such an organization. Another alternative might be to expand the program being developed by Ralph Tyler (the Program for the National Assessment of Educational Progress)* to include these evaluation functions, but this might not be feasible politically. Still another possibility might be to encourage the Research and Development Centers to take on the job.

The Research and Development Center at the University of California at Los Angeles already has focused upon the study of the theory, methods, and operation of activities to evaluate instructional programs.

All these approaches would try to centralize the scarce talent in a single location. If some decentralization is deemed desirable, it might be well to consider the Regional Educational Laboratories. The 20 RELs already have established relations with, and are familiar with, problems of the schools in their regions, and the sort of evaluation program needed might be easier to establish through the RELs than through another agency. It is not sufficient to establish the evaluation function; it is also necessary that appropriate data be accumulated on a recurring basis and that evaluation results, stemming from these data, be incorporated into the processes of planning and managing programs, schools, and school districts. One of the important tasks that the research organization could perform is to specify data requirements for educational research and to develop a comprehensive data bank with contributions from all participating school organizations. DHEW is urged to take the lead in encoraging the States and Districts to emphasize evaluation of their programs and to establish some centralized mechanism to get evaluations done. Evaluations are essential if the dollars allocated to education are to be employed effectively.

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*Reference 10, pp 378-380

Data Collection Formats for Title I Recipients

The most severe problem encountered in this study was the lack of accurate and relevant data on CE programs and pupil-school-environmental characteristics. These data are not consistently and systematically recorded by the school districts. Such was the case despite the several guidelines already provided by OE. Unless something is done to remedy this situation, timely, accurate and meaningful evaluation will remain difficult.

It is important to make proper arrangements so that data routinely collected by local school districts can be utilized, thereby circumventing the need for designing experimental programs to evaluate Federally funded projects. While it is recognized that requests by Federal Government agencies, for uniform procedures raise political and practical difficulties the requirement for consistent and uniform records is considered worthy of further attention.

APPENDIX A

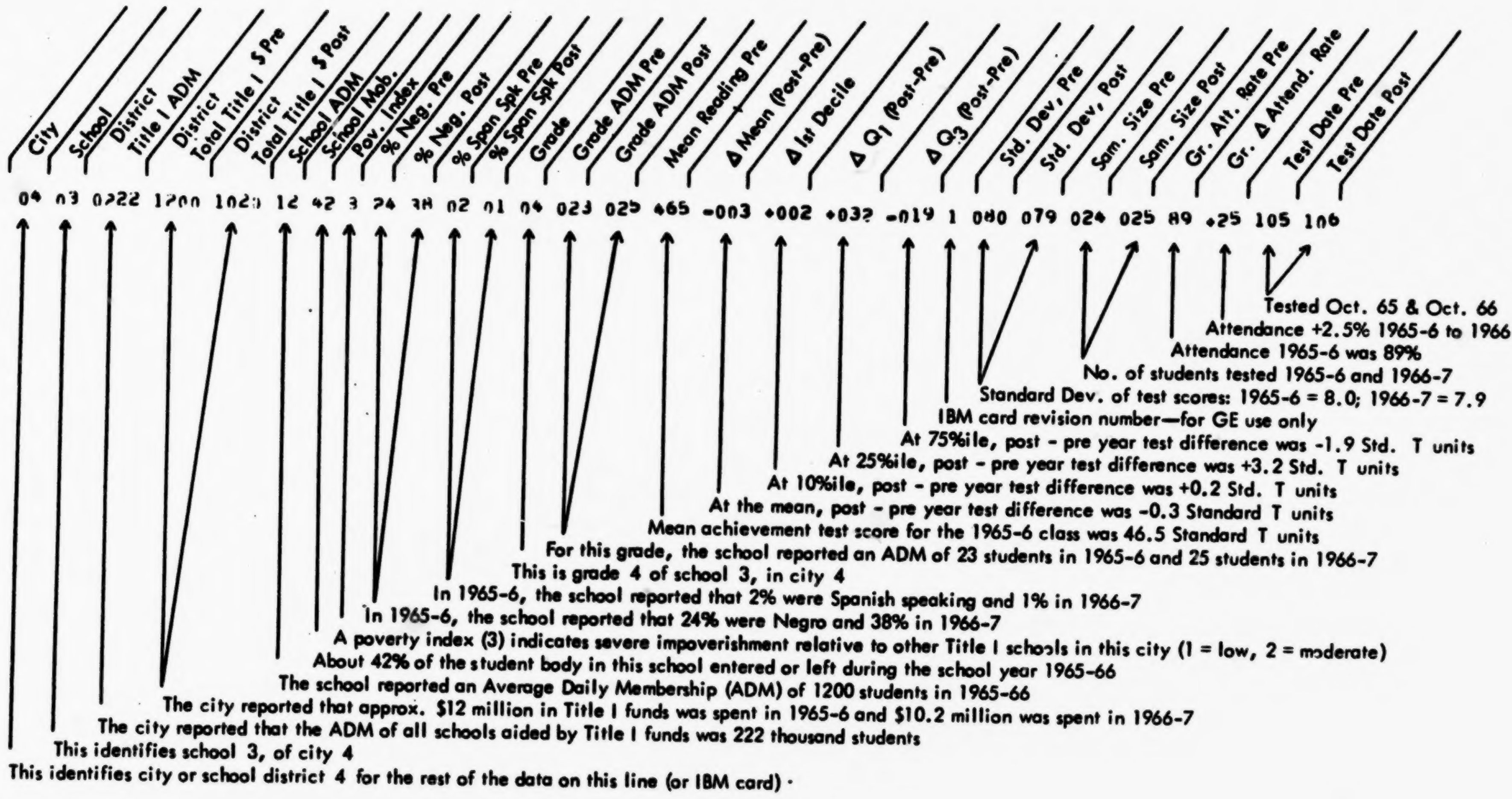
PRINTOUT OF THE DATA USED IN THE SURVEY

This appendix contains a printout of the data used in this survey for the regression, co-variance, and stratification analyses. Only grades which had achievement test results for both 1965-66 and 1966-67 were used as observations. To meet this criterion, it was necessary to discard many observations when a post-pre year match could not be made.

A total of 314 observations are shown covering 132 schools in 11 district. Eleven of the 12 grades are covered — there were no observations for the 9th grade in any district. Grades 10 and 12 contain only one observation each.

An example with a brief explanation of each datum or variable is shown on page 137.

The data are listed in ascending district, school and grade order starting on page 138.



Tested Oct. 65 & Oct. 66
Attendance +2.5% 1965-6 to 1966-7
Attendance 1965-6 was 89%
No. of students tested 1965-6 and 1966-7
Standard Dev. of test scores: 1965-6 = 8.0; 1966-7 = 7.9
IBM card revision number—for GE use only
At 75%ile, post - pre year test difference was -1.9 Std. T units
At 25%ile, post - pre year test difference was +3.2 Std. T units
At 10%ile, post - pre year test difference was +0.2 Std. T units
At the mean, post - pre year test difference was -0.3 Standard T units
Mean achievement test score for the 1965-6 class was 46.5 Standard T units
For this grade, the school reported an ADM of 23 students in 1965-6 and 25 students in 1966-7
This is grade 4 of school 3, in city 4
In 1965-6, the school reported that 2% were Spanish speaking and 1% in 1966-7
In 1965-6, the school reported that 24% were Negro and 38% in 1966-7
A poverty index (3) indicates severe impoverishment relative to other Title I schools in this city (1 = low, 2 = moderate)
About 42% of the student body in this school entered or left during the school year 1965-66
The school reported an Average Daily Membership (ADM) of 1200 students in 1965-66
The city reported that approx. $12 million in Title I funds was spent in 1965-6 and $10.2 million was spent in 1966-7
The city reported that the ADM of all schools aided by Title I funds was 222 thousand students
This identifies school 3, of city 4
This identifies city or school district 4 for the rest of the data on this line (or IBM card).

AN EXAMPLE FOR THE INTERPRETATION OF THE DATA

City	School	District Title I ADM	District Total Title I $ Pre	District Total Title I $ Post	School ADM	School Mob.	Pov. Index	% Neg. Pre	% Neg. Post	% Span Spk Pre	% Span Spk Post	Grade	Grade ADM Pre	Grade ADM Post	Mean Reading Pre	Δ Mean (Post-Pre)	Δ 1st Decile	Δ Q_1 (Post-Pre)	Δ Q_3 (Post-Pre)		Std. Dev. Pre	Std. Dev. Post	Sam. Size Pre	Sam. Size Post	Gr. Att. Rate Pre	Gr. Δ Attend. Rate	Test Date Pre	Test Date Post
01	01	0060	0256	0146	09	33	3	90	92			04	143	119	367	+024	+005	+031	+029	A	080	081	132	118	93	+03	056	057
01	01	0060	0256	0146	09	33	3	90	92			05	139	130	384	-003	-004	+009	-015	A	081	081	125	128	92	+10	056	057
01	02	0060	0256	0146	09	24	3	99	99			05	115	139	404	-016	-004	-031	-016	A	077	085	111	139	96	-07	058	037
01	04	0060	0256	0146	08	60	2	51	53			05	078	089	369	+008	-004	-004	+015	A	072	089	073	088	91	-22	056	037
01	05	0060	0256	0146	10	72	3	55	61			04	126	112	337	+015	+005	+005	+038	A	067	079	113	099	90	-03	056	057
01	05	0060	0256	0146	10	72	3	55	61			05	124	112	370	-018	-004	-028	+003	A	075	081	111	106	90	+08	056	037
01	06	0060	0256	0146	04	75	3	60	63			05	038	048	344	+023	-004	-034	+047	A	042	097	035	046	92	-04	056	037
01	07	0060	0256	0146	13	41	2	99	99			05	155		379	+002	-004	-037	+028	A	076	090	150	104	92		056	037
01	08	0060	0256	0146	14	41	3	90	91			05	164	191	378	-023	-004	-021	-032	A	078	087	158	171	92	-05	056	037
01	09	0060	0256	0146	09	23	3	99	99			04	132	115	394	-022	-023	-028	-008	A	072	073	128	109	94	-09	056	057
01	09	0060	0256	0146	09	23	3	99	99			05	127	114	389	+006	-012	-014	+023	A	075	085	122	116	94	+19	056	037
01	10	0060	0256	0146	07	72	3	10	19			04	090	078	362	+028	+019	+031	+018	A	072	084	084	074	92	-25	056	057
01	10	0060	0256	0146	07	72	3	10	19			05	081	078	361	+014	-004	+013	+022	A	079	084	067	080	91	-42	056	037
01	11	0060	0256	0146	05	92	3	31	34			05	061	054	339	+040	-004	+041	+067	A	074	086	090	053	88	+22	056	037
01	12	0060	0256	0146	08	57	3	69	74			04	066	056	401	-031	+005	+008	-084	A	096	073	064	056	94	-10	056	057
01	12	0060	0256	0146	08	57	3	69	74			05	088	088	365	+021	-004	+041	-004	A	105	095	084	080	93	-12	056	037
01	12	0060	0256	0146	08	57	3	69	74			06	078	081	389	+022	+036	+035	+008	A	094	083	077	079	92	+03	026	017
01	14	0060	0256	0146	08	45	2	92	94			04	091	094	333	+046	+005	+042	+068	A	067	091	085	089	94	-09	056	057
01	14	0060	0256	0146	08	45	2	92	94			05	099	086	370	+005	+002	-010	+016	A	095	080	086	081	94	-09	056	037

TOTAL DATA BY CITY, SCHOOL, AND GRADE

City	School	District Title I ADM	District Total Title I $ Pre	District Total Title I $ Post	School ADM	School Mob.	Pov. Index	% Neg. Pre	% Neg. Post	% Span Spk Pre	% Span Spk Post	Grade	Grade ADM Pre	Grade ADM Post	Mean Reading Pre	Δ Mean (Post-Pre)	Δ 1st Decile	Δ Q_1 (Post-Pre)	Δ Q_3 (Post-Pre)		Std. Dev. Pre	Std. Dev. Post	Sam. Size Pre	Sam. Size Post	Gr. Att. Rate Pre	Gr. Δ Attend. Rate	Test Date Pre	Test Date Post
01	14	0060	0256	0146	08	45	2	92	94			06	080	090	385	+010	+036	+003	-010	A	082	077	078	090	94	+06	026	017
01	15	0060	0256	0146	08	43	2	99	99			04	094	100	370	+000	+005	+005	-016	A	078	077	091	096	95	+03	056	057
01	15	0060	0256	0146	08	43	2	99	99			05	100	089	389	-005	+024	-014	-008	A	084	071	068	085	93	+36	056	037
01	16	0060	0256	0146	09	39	1	00	00			04	111	124	402	+030	+063	+033	+017	A	099	092	108	121	94	-02	056	057
01	16	0060	0256	0146	09	39	1	00	00			05	104	117	409	+004	+024	-024	-002	A	100	111	105	117	92	+00	056	037
01	16	0060	0256	0146	09	39	1	00	00			06	100	103	422	+014	+023	+001	+017	A	085	081	098	101	91	+03	026	017
01	17	0060	0256	0146	09	43	1	13	16			05	167	191	423	-006	-021	+004	-009	A	090	099	158	184	94	-08	056	037
01	18	0060	0256	0146	07	66	2	44	49			04	097	106	359	+011	+005	+022	-002	A	074	067	097	109	91	-01	056	057
01	18	0060	0256	0146	07	66	2	44	49			05	067	088	408	-048	-034	-069	-035	A	078	088	070	087	92	-50	056	037
01	19	0060	0256	0146	09	51	1	26	21			04	158	125	377	+011	+005	+035	+018	A	087	077	155	121	92	-36	056	057
01	19	0060	0256	0146	09	51	1	26	21			05	132	138	399	-012	-011	-034	+003	A	084	086	125	134	91	-03	056	037
01	19	0060	0256	0146	09	51	1	26	21			06	141	122	410	-010	-009	+008	-025	A	093	077	138	121	92	-20	026	017
01	20	0060	0256	0146	09	36	3	87	86			07	351	335	375	+010	+002	+022	+012	A	061	067	290	268	86	-26	056	057
01	20	0060	0256	0146	09	36	3	87	86			08	289	299	385	-011	-036	-018	-008	A	067	065	253	288	85	-15	056	126
01	21	0060	0256	0146	14	52	3	64	70			07	492	519	383	-015	-026	-011	-006	A	074	067	408	456	87	-13	056	057
01	21	0060	0256	0146	14	52	3	64	70			08	470	436	378	-007	-025	-008	-008	A	073	081	365	397	84	-01	056	126
01	22	0060	0256	0146	10	30	2	65	69			07	340	365	411	+000	+019	+000	+007	A	082	076	312	327	90	+04	056	057
01	22	0060	0256	0146	10	30	2	65	69			08	333	308	394	-002	-019	-018	+007	A	076	089	305	296	89	+14	056	126
01	23	0060	0256	0146	06	37	2	79	80			07	201	213	388	-011	+002	-025	-026	A	069	062	166	195	86	-02	056	057

TOTAL DATA BY CITY, SCHOOL, AND GRADE

City	School	District Title I ADM	District Total Title I $ Pre	District Total Title I $ Post	School ADM	School Mob.	Pov. Index	% Neg. Pre	% Neg. Post	% Span Spk Pre	% Span Spk Post	Grade	Grade ADM Pre	Grade ADM Post	Mean Reading Pre	Δ Mean (Post-Pre)	Δ 1st Decile	Δ Q1 (Post-Pre)	Δ Q3 (Post-Pre)	Std. Dev. Pre	Std. Dev. Post	Sam. Size Pre	Sam. Size Post	Gr. Att. Rate Pre	Gr. Δ Attend. Rate	Test Date Pre	Test Date Post
01	23	0060	0256	0146	06	37	2	79	80			08	204	189	394	-008	-008	-018	+010 A	076	075	166	172	92	+01	096	126
02	01	0209	0353	0328	05	88	3	69	67	07	12	02	075	085	438	-045	+018	-037	-067	103	056	067	072	88	+03	105	106
02	01	0209	0353	0328	05	88	3	69	67	07	12	03	086	075	405	+013	+028	+045	-024	098	094	077	070	90	+02	105	106
02	01	0209	0353	0328	05	88	3	69	67	07	12	04	079	073	421	-018	+000	-029	-038	094	091	072	071	91	+00	105	106
02	01	0209	0353	0328	05	88	3	69	67	07	12	05	063	082	424	-043	-040	-077	-053	076	077	048	070	88	+04	105	106
02	01	0209	0353	0328	05	88	3	69	67	07	12	06	074	052	368	+027	+028	+030	+033	086	068	061	042	90	+02	105	106
02	02	0209	0353	0328	10	37	3	99	99	00	00	02	180	179	460	+007	+068	+024	-040	127	106	176	155	94	-01	105	106
02	02	0209	0353	0328	10	37	3	99	99	00	00	03	189	193	434	-004	+058	-012	-020	069	095	157	148	93	+01	105	106
02	02	0209	0353	0328	10	37	3	99	99	00	00	04	179	184	412	+007	+045	+010	-003	104	094	167	167	93	+01	105	106
02	02	0209	0353	0328	10	37	3	99	99	00	00	05	148	159	396	+008	+000	+000	+011	088	080	130	148	93	+00	105	106
02	03	0209	0353	0328	07	44	2	50	58	28	23	02	088	135	466	-039	-040	-037	-063	112	095	082	125	95	+00	105	106
02	03	0209	0353	0328	07	44	2	50	58	28	23	03	097	114	474	-011	+025	-004	-021	102	098	096	105	94	+02	105	106
02	03	0209	0353	0328	07	44	2	50	58	28	23	04	095	104	441	+028	+068	+016	+026	099	087	081	097	95	+00	105	106
02	03	0209	0353	0328	07	44	2	50	58	28	23	05	100	106	438	-025	+000	-027	-025	092	086	098	105	96	-01	105	106
02	03	0209	0353	0328	07	44	2	50	58	28	23	06	095	101	469	-046	+000	-032	-050	104	087	076	099	96	+00	105	106
02	04	0209	0353	0328	07	72	2	35	37	29	28	02	099	125	473	-040	-077	-032	-063	098	090	095	121	94	+00	105	100
02	04	0209	0353	0328	07	72	2	35	37	29	28	04	108	112	445	+015	+030	-017	+047	092	103	106	108	93	+00	105	106
02	04	0209	0353	0328	07	72	2	35	37	29	28	05	088	116	480	-060	-065	-042	-078	099	090	080	098	93	+00	105	106

TOTAL DATA BY CITY, SCHOOL, AND GRADE

City	School	District Title I ADM	District Total Title I $ Pre	District Total Title I $ Post	School ADM	School Mob.	Pov. Index	% Neg. Pre	% Neg. Post	% Span Spk Pre	% Span Spk Post	Grade	Grade ADM Pre	Grade ADM Post	Mean Reading Pre	Δ Mean (Post-Pre)	Δ 1st Decile	Δ Q_1 (Post-Pre)	Δ Q_3 (Post-Pre)	Std. Dev. Pre	Std. Dev. Post	Sam. Size Pre	Sam. Size Post	Gr. Att. Rate Pre	Gr. Δ Attend. Rate	Test Date Pre	Test Date Post
02	04	0209	0353	0328	07	72	2	35	37	29	28	06	098	108	462	-024	-040	+000	-029	103	094	093	089	94	+00	105	106
02	04	0209	0353	0328	07	72	2	35	37	29	28	03	097	123	483	-011	-031	-020	+007	088	098	085	105	94	+00	105	106
02	05	0209	0353	0328	17	99	1	99	99	00	00	03	323	322	438	+024	+025	+012	+012	082	089	316	359	94	+01	105	106
02	05	0209	0353	0328	17	99	1	99	99	00	00	04	276	364	416	+004	+017	-015	+000	087	085	279	405	94	+01	105	106
02	05	0209	0353	0328	17	99	1	99	99	00	00	05	261	306	424	-039	-040	-037	-060	081	065	256	342	94	+01	105	106
02	05	0209	0353	0328	17	99	1	99	99	00	00	06	251		439	-047	-040	-047	-062	084	068	244	337	94	+01	105	106
02	06	0209	0353	0328	08	12	3	99	99	00	00	03	115	091	443	+021	+025	+024	+019	084	087	114	089	93	+01	105	106
02	06	0209	0353	0328	08	12	3	99	99	00	00	04	112	128	416	-018	+000	-035	-032	079	088	101	121	93	+00	105	106
02	06	0209	0353	0328	08	12	3	99	99	00	00	05	100	106	408	-013	+000	-015	-020	079	064	091	102	93	+00	105	106
02	06	0209	0353	0328	08	12	3	99	99	00	00	06	100	209	419	-031	+000	-010	-053	093	070	093	204	94	+00	105	106
02	07	0209	0353	0328	09	86	2	01	02	53	64	02	149	176	441	+020	+004	+057	+013	087	080	145	146	93	-01	105	106
02	07	0209	0353	0328	09	86	2	01	02	53	64	03	138	159	486	-016	-012	-010	-024	092	086	136	133	94	-01	105	106
02	07	0209	0353	0328	09	86	2	01	02	53	64	04	134	151	458	+027	+010	+036	+021	107	096	132	126	94	-01	105	106
02	07	0209	0353	0328	09	86	2	01	02	53	64	05	109	148	448	-012	+017	+020	-015	103	079	108	107	95	-02	105	106
02	07	0209	0353	0328	09	86	2	01	02	53	64	06	127	131	456	+019	+049	+051	-010	108	087	128	098	94	+00	105	106
02	08	0209	0353	0328	04	67	2	50	50	08	02	02	056	057	445	+024	+040	+024	+026	108	118	052	063	94	+00	105	106
02	08	0209	0353	0328	04	67	2	50	50	08	02	03	061	065	501	-041	-033	-044	-002	096	115	057	061	95	+00	105	106
02	08	0209	0353	0328	04	67	2	50	50	08	02	04	063	050	489	-038	-023	-065	-014	111	108	060	049	95	-03	105	106
02	08	0209	0353	0328	04	67	2	50	50	08	02	05	085	058	457	-032	-048	-051	-035	098	103	085	060	94	+00	105	106

TOTAL DATA BY CITY, SCHOOL, AND GRADE

City	School	District Title I ADM	District Total Title I $ Pre	District Total Title I $ Post	School ADM	School Mob.	Pov. Index	% Neg. Pre	% Neg. Post	% Span Spk Pre	% Span Spk Post	Grade	Grade ADM Pre	Grade ADM Post	Mean Reading Pre	Δ Mean (Post-Pre)	Δ 1st Decile	Δ Q_1 (Post-Pre)	Δ Q_3 (Post-Pre)	Std. Dev. Pre	Std. Dev. Post	Sam. Size Pre	Sam. Size Post	Gr. Att. Rate Pre	Gr. Δ Attend. Rate	Test Date Pre	Test Date Post
02	08	0209	0353	0328	04	67	2	50	50	08	02	06	049	082	476	-074	-066	-058	-071	102	096	050	106	93	+00	105	106
02	09	0209	0353	0328	06	20	3	99	99	00	00	02	108	113	512	-101	-061	-075	-120	083	067	107	104	94	-02	105	106
02	09	0209	0353	0328	06	20	3	99	99	00	00	03	115	103	431	-027	-025	-031	-045	083	083	108	104	94	+01	105	106
02	09	0209	0353	0328	06	20	3	99	99	00	00	04	108	107	406	-009	+000	-010	-020	089	086	105	103	94	+00	105	106
02	09	0209	0353	0328	06	20	3	99	99	00	00	05	098	106	384	-004	+000	+017	-001	081	077	078	100	93	+01	105	106
02	09	0209	0353	0328	06	20	3	99	99	00	00	06	106	085	405	-029	+028	+017	-063	097	071	099	080	93	+01	105	106
02	10	0209	0353	0328	07	15	3	99	99	00	00	02	127	128	471	+001	+011	+013	-025	099	063	128	125	96	-01	105	106
02	10	0209	0353	0328	07	15	3	99	99	00	00	03	125	123	457	+007	+000	-004	+013	078	095	126	123	94	+01	105	106
02	10	0209	0353	0328	07	15	3	99	99	00	00	04	117	129	467	-031	-060	-042	-010	078	088	112	119	94	+01	105	106
02	10	0209	0353	0328	07	15	3	99	99	00	00	05	128	121	434	-010	+018	-021	-020	083	070	102	115	95	+00	105	106
02	10	0209	0353	0328	07	15	3	99	99	00	00	06	108	121	439	-035	-008	-042	-036	077	072	101	119	96	+00	105	106
02	11	0209	0353	0328	06	49	2	00	00	06	08	02	095	120	442	+005	+040	+024	-013	095	100	094	114	94	+00	105	106
02	11	0209	0353	0328	06	49	2	00	00	06	08	03	079	098	477	-001	+025	-020	-003	088	097	077	090	94	+00	105	106
02	11	0209	0353	0328	06	49	2	00	00	06	08	04	097	108	458	+055	+061	+066	+044	098	092	101	093	94	+00	105	106
02	11	0209	0353	0328	06	49	2	00	00	06	08	05	073	094	459	-037	-002	-013	-050	101	070	068	063	94	+00	105	106
02	11	0209	0353	0328	06	49	2	00	00	06	08	06	064	077	455	-002	-005	+004	+003	091	085	060	074	95	-02	105	106
02	12	0209	0353	0328	07	17	3	99	99	00	00	02	166	127	443	-007	-040	+000	+000	078	088	161	118	93	+01	105	106
02	12	0209	0353	0328	07	17	3	99	99	00	00	03	132	139	432	-012	+040	+012	-040	087	065	122	135	93	+00	105	106
02	12	0209	0353	0328	07	17	3	99	99	00	00	04	115	122	422	-018	+000	-023	-012	119	093	107	119	93	+02	105	106

TOTAL DATA BY CITY, SCHOOL, AND GRADE

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02	12	0209	0353	0328	07	17	3	99	99	00	00	05	135	099	411	-020	+000	-002	-030		081	073	134	102	94	+00	105	106
03	01	0016	0074	0056	04		3	50	48		00	04	045	35	453	-025	+010	-028	-021	1	078	070	046	030	93	+02	016	017
03	01	0016	0074	0056	04		3	50	48		00	06	037	039	419	+041	+019	+042	+065	1	075	080	037	038	92	+07	016	017
03	02	0016	0074	0056	04		2		32		00	04	055	058	478	+003	-034	+013	+014	1	074	083	054	057	94	-01	016	017
03	02	0016	0074	0056	04		2		32		00	06	067	064	496	-036	-032	-028	-043	1	089	079	066	062	94	-06	016	017
03	03	0016	0074	0056	03		3		17		19	04	024	027	402	+004	-045	+061	+002	1	080	077	023	026	93	+12	016	017
03	03	0016	0074	0056	03		3		17		19	06	024	029	437	-002	+055	+009	-020	1	080	055	025	025	94	-10	016	017
03	04	0016	0074	0056	02		2		62		00	04	027	020	439	+045	+045	+015	+053	2	067	074	026	022	94	+07	016	017
03	04	0016	0074	0056	02		2		62		00	06	023	022	456	+008	-020	+023	+026	2	069	089	021	022	93	+15	016	017
03	05	0016	0074	0056	03		2		92		00	04	034	035	395	+002	-045	-042	+025	1	061	083	033	035	94	+12	016	017
03	05	0016	0074	0056	03		2		92		00	06	035	031	392	+004	+000	+009	+032	1	080	102	029	029	93	+02	016	017
03	06	0016	0074	0056	02		2		09		00	04	023	034	462	+034	+025	+049	+054	1	084	090	023	031	96	-17	016	017
03	06	0016	0074	0056	02		2		09		00	06	026	026	459	-006	+016	+000	+002	1	080	070	026	026	95	-09	016	017
03	07	0016	0074	0056	05		2		18		02	04	073	057	454	+016	+046	+021	+014	2	084	089	069	058	95	+05	016	017
03	07	0016	0074	0056	05		2		18		02	06	073	083	485	+001	-007	-043	+034	1	098	114	072	084	95	+07	016	017
03	08	0016	0074	0056	06		1		00		02	04	085	083	493	+020	+014	+000	+017	1	089	086	079	082	95	+12	016	017
03	08	0016	0074	0056	06		1		00		02	06	066	076	480	-029	-007	-028	-031	1	090	075	059	076	94	+06	016	017
03	09	0016	0074	0056	03		1		01		00	04	046	046	461	+002	+048	-001	+000	1	096	080	045	044	95	+05	016	017

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03	09	0016	0074	0056	03		1		01		00	06	039	033	426	+008	+024	+018	+011	1	066	069	037	034	93	+17	016	017
03	10	0016	0074	0056	06		3		60		02	04	063	064	439	-022	+013	-024	-032	2	087	077	041	049	94	-05	016	017
03	10	0016	0074	0056	06		3		60		02	06	063	065	416	-023	-008	-030	-025	1	086	088	057	066	91	+16	016	017
03	11	0016	0074	0056	06		3		76		00	04	080	083	417	+008	-017	-042	+017	1	074	086	075	079	94	+07	016	017
03	11	0016	0074	0056	06		3		76		00	06	067	060	419	-020	+000	-012	-005	1	089	074	064	057	94	+11	016	017
03	12	0016	0074	0056	04		2		14		00	04	057	051	452	+015	+048	+008	+017	1	091	086	051	050	93	+09	016	017
03	12	0016	0074	0056	04		2		14		00	06	054	049	463	-021	-008	-037	-013	1	080	079	048	048	92	+23	016	017
03	13	0016	0074	0056	02		3		25		02	04	014	020	473	-055	+001	-019	-099	1	086	059	016	017	93	+07	016	017
03	13	0016	0074	0056	02		3		25		02	06	021	019	447	-070	-125	-110	-057	1	049	082	022	018	92	+20	016	017
03	14	0016	0074	0056	05		1		22		03	04	082	057	481	+026	+061	+065	+000	1	116	082	072	041	96	-10	016	017
03	14	0016	0074	0056	05		1		22		03	06	068	064	490	-031	-059	-062	-046	1	072	092	067	059	95	+05	016	017
03	15	0016	0074	0056	08		2		03		01	04	098	102	474	-016	+013	+000	-024	1	100	095	087	099	94	+11	016	017
03	15	0016	0074	0056	08		2		03		01	06	109	114	446	-012	+030	-020	-002	1	085	085	097	106	94	+00	016	017
03	16	0016	0074	0056	06		2		28		00	08	198	159	493	-002	+018	+024	-018	1	102	088	193	152	93	+09	016	017
03	17	0016	0074	0056	08		3		28		03	08	198	212	447	+025	+025	+009	+025	1	088	092	191	205	91	+11	016	017
03	18	0016	0074	0056	06		3		47		01	08	189	198	464	-009	-031	+000	-005	2	083	085	184	174	92	-11	016	017
03	19	0016	0074	0056	07		1		00		02	08	193	255	465	-001	+022	-011	+005	1	084	080	192	251	92	+13	016	017
03	20	0016	0074	0056	09		1		04		01	08	284	304	473	-005	-006	+000	-010	2	081	079	280	298	92	+17	016	017
03	21	0016	0074	0056	17		1		06		01	10	630	609	488	+005	+000	+000	+000	1	090	091	598	585	92	+03	095	096

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03	21	0016	0074	0056	17		1		96		01	11	535	586	506	-019	-017	-033	-014	1	096	093	534	579	93	-15	095	096
03	21	0016	0074	0056	17		1		96		01	12	526	492	512	+009	+013	+000	+013	1	096	098	482	501	93	-05	095	096
04	01	0222	1200	1020	12	46	3	96	95	00	00	04	085	082	403	-003	-003	+015	-020	1	079	065	083	056	91	-04	105	106
04	01	0222	1200	1020	12	46	3	96	95	00	00	06	074	081	402	+003	+058	+006	-014	1	084	064	068	077	91	-04	105	106
04	02	0222	1200	1020	06	99	3	17	15	04	04	04	044	062	435	+000	+015	+009	-022	1	082	063	041	045	95	-08	105	106
04	02	0222	1200	1020	06	99	3	17	15	04	04	06	047	039	412	+010	+017	+009	+010	1	079	094	033	044	95	-08	105	106
04	03	0222	1200	1020	12	42	2	24	38	02	01	04	023	025	465	-003	+002	+032	-019	1	080	079	024	025	89	+25	105	106
04	03	0222	1200	1020	12	42	2	24	38	02	01	06	029	022	456	-031	-031	-027	-064	1	072	085	026	021	89	+25	105	106
04	04	0222	1200	1020	10	40	2	99	99	00	00	04	084	073	429	-009	-058	-020	+002	1	068	086	083	064	89	+38	105	106
04	04	0222	1200	1020	10	40	2	99	99	00	00	06	078	081	385	+005	+000	+009	+001	1	081	082	076	085	89	+38	105	106
04	05	0222	1200	1020	03	99	3	29	24	02	04	04	026	032	426	-016	-056	+000	-015	1	076	077	024	030	87	-08	105	106
04	05	0222	1200	1020	03	99	3	29	24	02	04	06	020	021	420	-015	-009	-054	-011	1	055	069	017	019	87	-08	105	106
04	06	0222	1200	1020	16	40	2	98	98	00	00	04	141	172	431	-011	+009	-009	-017	1	066	061	130	165	91	+11	105	106
04	06	0222	1200	1020	16	40	2	98	98	00	00	06	130	149	398	+003	+000	-007	-004	1	069	073	124	140	91	+11	105	106
04	07	0222	1200	1020	13	31	1	97	97	00	00	04	079	096	427	-016	-014	+000	-028	1	083	076	069	091	92	+09	105	106
04	09	0222	1200	1020	04	45	3	45	38	27	31	06	020	027	393	+001	+049	+003	+015	1	078	072	020	026	90	-03	105	106
04	10	0222	1200	1020	07	32	1	94	94	01	01	04	054	046	422	+012	+040	+000	+025	1	071	070	048	046	91	+25	105	106
04	10	0222	1200	1020	07	32	1	94	94	01	01	06	050	030	432	-007	-058	-041	+036	1	070	086	040	030	91	+25	105	106

TOTAL DATA BY CITY, SCHOOL, AND GRADE

City	School	District Title I ADM	District Total Title I $ Pre	District Total Title I $ Post	School ADM	School Mob.	Pov. Index	% Neg. Pre	% Neg. Post	% Span Spk Pre	% Span Spk Post	Grade	Grade ADM Pre	Grade ADM Post	Mean Reading Pre	Δ Mean (Post-Pre)	Δ 1st Decile	Δ Q1 (Post-Pre)	Δ Q3 (Post-Pre)		Std. Dev. Pre	Std. Dev. Post	Sam. Size Pre	Sam. Size Post	Gr. Att. Rate Pre	Gr. Δ Attend. Rate	Test Date Pre	Test Date Post
04	11	0222	1200	1020	09	49	2	21	19	36	34	04	081	065	444	-021	+049	+000	-020	1	086	068	078	063	90	-04	105	106
04	11	0222	1200	1020	09	49	2	21	19	36	34	06	068	068	430	-030	-011	-028	-019	1	079	069	051	068	90	-04	105	106
04	12	0222	1200	1020	16	29	1	53	57	00	01	08			426	-024	-025	-032	-024	1	081	075	325	344	91	-14	105	106
04	13	0222	1200	1020	10	37	1	14	12	12	17	08			455	-011	-006	-014	-017	1	084	073	247	230	88	-20	105	106
04	14	0222	1200	1020	13	54	3	68	76	01	01	08			409	-010	+000	+015	-025	1	084	071	203	200	84	-11	105	106
04	15	0222	1200	1020	12	31	3	98	97	00	00	08			405	+003	+000	-007	+001	1	071	088	224	221	88	-01	105	106
04	16	0222	1200	1020	17	29	1	96	97	00	00	08			416	+001	+030	-006	+010	1	082	073	348	340	92	-09	105	106
04	07	0222	1200	1020	13	31	1	97	97	00	00	06	066	080	436	-042	-071	-080	-013	1	067	086	051	079	92	+09	105	106
04	08	0222	1200	1020	07	50	1	04	04	02	01	04	051	061	452	-015	+022	+000	-013	1	079	072	047	057	92	+14	105	106
04	08	0222	1200	1020	07	50	1	04	04	02	01	06	045	050	475	-032	-050	-020	-042	1	083	076	042	051	92	+14	105	106
04	09	0222	1200	1020	04	45	3	45	38	27	31	04	036	032	438	-020	-082	-048	-021	1	068	083	028	031	90	-03	105	106
05	02	0050	0188	0157	06		1	07	10	00	00	04			463	-009	+000	-020	-021	0	074	085	052	053			036	037
05	02	0050	0188	0157	06		1	07	10	00	00	06			395	+001	-054	+011	-067	0	078	081	046	046			036	047
05	04	0050	0188	0157	08	39	3	99	99	00	00	04	084	070	419	-008	+000	+037	-013	0	083	070	083	064			036	037
05	04	0050	0188	0157	08	39	3	99	99	00	00	06	098	082	392	-014	+028	+010	-016	0	094	067	068	090			036	047
05	08	0050	0188	0157	03		3	05	05	00	00	04			406	-008	+020	+000	-076	0	095	074	029	034			036	037
05	08	0050	0188	0157	03		3	05	05	00	00	06			398	+007	+030	-010	+013	0	079	081	038	037			036	047
05	10	0050	0188	0157	07		3	63	73	00	00	04			417	-007	-040	+000	-015	0	082	071	063	090			036	037

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05	10	0050	0188	0157	07		3	63	73	00	00	06			410	-011	-003	-015	-006	0	075	068	065	047			036	047
05	14	0050	0188	0157	07		2	03	02	00	00	04			448	-014	+000	+000	-020	0	084	080	105	083			036	037
05	14	0050	0188	0157	07		2	03	02	00	00	06			430	+005	+015	+005	+021	0	072	067	072	078			036	047
05	16	0050	0188	0157	03		2	14	13	00	00	04			425	+016	+000	+000	+031	0	064	088	029	023			036	037
05	16	0050	0188	0157	03		2	14	13	00	00	06			379	+032	+036	+049	+036	0	064	065	025	022			036	047
05	26	0050	0188	0157	14		3	99	99	00	00	04			415	+007	+000	+037	+020	0	079	079	145	123			036	037
05	26	0050	0188	0157	14		3	99	99	00	00	06			384	+000	+000	+000	-006	0	078	081	122	085			036	047
05	32	0050	0188	0157	06		2	89	90	00	00	04			426	-019	-040	-019	+023	0	080	088	061	066			036	037
05	32	0050	0188	0157	06		2	89	90	00	00	06			398	+019	+000	+000	+011	0	061	071	052	052			036	037
05	38	0050	0188	0157	09		1	75	79	00	00	04			436	+001	+000	+000	+013	0	076	082	097	106			036	037
05	38	0050	0188	0157	09		1	75	79	00	00	06			414	-014	-033	-006	-012	0	070	070	066	089			036	047
05	42	0050	0188	0157	11		1	99	99	00	00	04			459	-001	+000	+000	-025	0	099	089	137	135			036	037
05	42	0050	0188	0157	11		1	99	99	00	00	06			465	-007	-034	-026	+000	0	093	110	098	106			036	047
05	51	0050	0188	0157	10		2	38	45	00	00	04			434	+016	+000	+024	+026	0	086	081	109	107			036	037
05	51	0050	0188	0157	10		2	38	45	00	00	06			418	-015	-028	-015	-021	0	077	081	085	090			036	047
05	52	0050	0188	0157	07		3	50	55	00	00	04			435	-027	-032	-037	-045	0	085	073	065	081			036	037
05	52	0050	0188	0157	07		3	50	55	00	00	06			400	-013	-058	-020	-020	0	070	076	072	066			036	047
05	56	0050	0188	0157	09		1	99	99	00	00	04			456	-001	+037	+000	-028	0	085	074	095	074			036	037
05	56	0050	0188	0157	09		1	99	99	00	00	06			414	+004	+005	+016	+006	0	079	085	078	073			036	047

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05	63	0050	0188	0157	05		2	99	99	00	00	04			403	+030	+000	+037	+053	0	075	079	059	064			036	037
05	63	0050	0188	0157	05		2	99	99	00	00	06			429	-015	-045	-039	+003	0	096	102	040	045			036	047
06	01	0015	0115	0122	04	13	3	63	60	00	00	03	075	105	419	+022	+084	+020	+000	1	088	076	072	082	94	+00	036	037
06	01	0015	0115	0122	04	13	3	63	60	00	00	06	070	071	426	+029	+038	+033	+018	1	091	058	045	034	94	+35	036	037
06	02	0015	0115	0122	03	29	2	25	25	00	00	06	045	034	446	+015	+050	+033	+012	1	091	058	045	034			036	037
06	02	0015	0115	0122	03	29	2	25	25	00	00	03	031	032	435	-015	-004	-015	+004	1	081	072	031	032			036	037
08	01	0043	0122	0121	06	69	3	32	21	00	00	02	087	090	446	+008	-002	-020	+038		064	087	081	091	93		046	047
08	01	0043	0122	0121	06	69	3	32	21	00	00	03	081	080	450	-002	+000	-020	+013		060	061	078	080	94		046	047
08	01	0043	0122	0121	06	69	3	32	21	00	00	04	085	075	447	+003	-037	-006	+026		071	087	081	074	95		046	047
08	01	0043	0122	0121	06	69	3	32	21	00	00	05	076	091	464	-022	-004	+000	-038		089	075	070	095	95		046	047
08	01	0043	0122	0121	06	69	3	32	21	00	00	06	089	075	453	-009	+011	-020	-026		071	076	083	076	95		046	047
08	02	0043	0122	0121	08	42	3	51	51	00	00	02	087	105	467	-041	-077	-020	-075		072	078	068	105	94		046	047
08	02	0043	0122	0121	08	42	3	51	51	00	00	03	068	092	467	-015	+000	-037	-010		075	066	064	089	94		046	047
08	02	0043	0122	0121	08	42	3	51	51	00	00	04	074	076	426	-006	+000	-012	+000		064	072	069	075	95		046	047
08	02	0043	0122	0121	08	42	3	51	51	00	00	05	069	089	471	-035	-037	-020	-063		081	071	066	083	94		046	047
08	02	0043	0122	0121	08	42	3	51	51	00	00	06	068	088	444	+007	+037	+000	-013		077	079	062	089	96		046	047
08	03	0043	0122	0121	08	41	1	62	78	00	00	03	105	136	430	-009	-037	+000	-013		064	057	103	136	94		046	047

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08	03	0043	0122	0121	08	41	1	62	78	00	00	04	131	120	435	+002	+000	+006	+000	077	082	128	084	95		046	047
08	03	0043	0122	0121	08	41	1	62	78	00	00	05	104	128	438	-012	+000	-024	-025	074	073	099	120	95		046	047
08	03	0043	0122	0121	08	41	1	62	78	00	00	06	096	103	460	-006	+000	-020	+000	071	071	095	100	96		046	047
08	03	0043	0122	0121	08	41	1	62	78	00	00	02	126	134	455	-007	+000	+000	-025	101	072	134	131	95		046	047
08	04	0043	0122	0121	05	41	3	07	08	00	00	02	138	072	452	-009	+000	+000	-010	088	087	136	064	93		046	047
08	04	0043	0122	0121	05	41	3	07	08	00	00	03	109	089	448	+006	+015	+000	+000	080	066	105	078	94		046	047
08	04	0043	0122	0121	05	41	3	07	08	00	00	04	115	082	425	+022	+040	+037	+022	088	091	114	074	93		046	047
08	04	0043	0122	0121	05	41	3	07	08	00	00	05	104	082	476	+004	+000	+000	+019	083	100	095	074	95		046	047
08	04	0043	0122	0121	05	41	3	07	08	00	00	06	080	085	466	+015	+007	+000	+013	076	080	076	078	94		046	047
08	05	0043	0122	0121	05	85	2	00	00	00	00	02	084	081	469	-036	-061	-043	-045	066	084	076	078	92		046	047
08	05	0043	0122	0121	05	85	2	00	00	00	00	03	071	076	437	+033	+000	+000	+057	067	080	065	055	95		046	047
08	05	0043	0122	0121	05	85	2	00	00	00	00	04	096	057	415	+014	+000	+037	+015	078	075	088	056	92		046	047
08	05	0043	0122	0121	05	85	2	00	00	00	00	05	063	087	433	-009	+000	-024	-009	066	080	056	086	93		046	047
08	05	0043	0122	0121	05	85	2	00	00	00	00	06	060	064	461	-019	+019	-044	-026	076	075	059	064	93		046	047
08	06	0043	0122	0121	07	22	3	99	99	00	00	02	115	123	459	-013	+000	+000	+000	076	064	115	119	94		046	047
08	06	0043	0122	0121	07	22	3	99	99	00	00	03	153	110	399	+026	+077	+000	+042	061	059	153	110	95		046	047
08	06	0043	0122	0121	07	22	3	99	99	00	00	04	126	143	391	+001	-005	+000	-013	064	077	122	145	95		046	047
08	06	0043	0122	0121	07	22	3	99	99	00	00	05	130	119	408	+008	+000	+000	+015	071	075	130	111	94		046	047
08	06	0043	0122	0121	07	22	3	99	99	00	00	06	099	122	433	-009	+000	+000	+000	071	077	098	124	94		046	047

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08	07	0043	0122	0121	04	54	1	01	01	00	00	02	061	059	422	+050	+077	+062	+069	093	087	061	060	94		046	047
08	07	0043	0122	0121	04	54	1	01	01	00	00	03	079	047	424	+034	+048	+044	+038	074	075	078	042	94		046	047
08	07	0043	0122	0121	04	54	1	01	01	00	00	04	057	063	408	+012	+040	+028	+016	087	075	057	058	93		046	047
08	07	0043	0122	0121	04	54	1	01	01	00	00	05	047	059	444	-013	+032	-024	-025	084	082	041	051	94		046	047
08	07	0043	0122	0121	04	54	1	01	01	00	00	06	057	041	472	-049	-037	-098	-026	073	082	051	042	93		046	047
08	08	0043	0122	0121	06	16	2	99	99	00	00	02	119	094	458	+002	+000	+000	-002	070	063	116	080	92		046	047
08	08	0043	0122	0121	06	16	2	99	99	00	00	03	115	109	453	-048	-037	-024	-058	079	059	097	101	93		046	047
08	08	0043	0122	0121	06	16	2	99	99	00	00	04	117	094	399	+006	+000	+000	+013	075	084	104	090	93		046	047
08	08	0043	0122	0121	06	16	2	99	99	00	00	05	099	095	448	+001	+000	+000	-013	076	080	072	091	93		046	047
08	08	0043	0122	0121	06	16	2	99	99	00	00	06	089	083	443	-016	+000	-024	+000	067	075	083	080	93		046	047
08	09	0043	0122	0121	09	29	2	99	99	00	00	02	167	184	411	+024	+040	+061	+000	079	097	116	177	92		046	047
08	09	0043	0122	0121	09	29	2	99	99	00	00	03	166	128	437	-001	+000	+000	-013	066	064	143	126	93		046	047
08	09	0043	0122	0121	09	29	2	99	99	00	00	04	141	154	398	+015	+000	+000	+028	076	076	133	148	93		046	047
08	09	0043	0122	0121	09	29	2	99	99	00	00	05	106	141	430	+007	+000	+024	+012	068	076	100	134	95		046	047
08	09	0043	0122	0121	09	29	2	99	99	00	00	06	106	092	443	-014	-026	+000	-026	080	078	102	087	94		046	047
08	10	0043	0122	0121	11	12	1	99	99	00	00	07	397	350	408	-012	+000	+000	-025	084	075	380	330	87		046	047
08	10	0043	0122	0121	11	12	1	99	99	00	00	08	381	377	413	-023	+000	+000	-028	080	078	367	365	91		046	047
08	11	0043	0122	0121	10	43	3	47	48	00	00	08	332	312	433	+006	+040	+000	+000	085	080	330	302	91		046	047
08	12	0043	0122	0121	15	16	1	55	63	00	00	07	483	501	451	-012	+000	+000	-025	097	087	455	481	94		046	047

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08	12	0043	0122	0121	15	16	1	55	63	00	00	08	480	488	478	-038	+000	-044	-054		084	086	447	471	94		046	047
08	13	0043	0122	0121	07	49	3	23	23	00	00	07	264	245	433	+001	+000	+000	-025		085	079	246	212	91		046	047
08	13	0043	0122	0121	07	49	3	23	23	00	00	08	243	253	437	-003	+000	+000	+000		086	082	227	226	89		046	047
08	14	0043	0122	0121	16	48	1	16	19	00	00	11	592	605	440	+000	+011	+004	-009	A	079	076	550	498	93		016	047
08	15	0043	0122	0121	16	45	1	99	99	00	00	11	515	473	423	-016	+004	-009	-009	A	075	074	446	398	87		016	047
08	16	0043	0122	0121	14	44	1	47	55	00	00	11	424	416	476	-009	+003	-009	-011	A	081	083	398	382	92		016	047
10	01	0068	0363	0408	02	28	2	69	99	00	00	03	024	019	360	+001	+048	+015	-020	2	067	051	025	021	92	+31	095	096
10	01	0068	0363	0408	02	28	2	69	99	00	00	04	026	018	445	-055	-049	-055	-063	2	066	062	022	024	94	-26	095	096
10	02	0068	0363	0408	05	62	3	99	99	00	00	03	068	060	342	-009	-020	-020	-010	2	056	053	066	055	88	+32	095	096
10	02	0068	0363	0408	05	62	3	99	99	00	00	04	065	062	414	-026	-008	+015	-033	2	077	052	060	061	86	+23	095	096
10	04	0068	0363	0408	02	35	2	99	99	00	00	03	029	035	314	+048	+057	+038	+025	2	057	058	036	038	89	+19	095	096
10	05	0068	0363	0408	16	25	2	99	99	00	00	03	201	224	325	-017	-020	-030	-030	2	061	064	169	234	82	+99	095	096
10	05	0068	0363	0408	16	25	2	99	99	00	00	05	193	198	364	+016	+015	+005	+026	2	054	069	165	212	88	+60	095	096
10	06	0068	0363	0408	03	74	3	74	99	00	00	03	036	065	332	-030	-052	-040	-010	2	066	074	037	064	91	-22	095	096
10	07	0068	0363	0408	03	47	1	90	44	10	10	03	059	050	366	+010	+006	+030	-017	2	066	063	056	054	92	+15	095	096
10	08	0068	0363	0408	06	17	2	99	99	00	00	03	102	084	345	-014	+060	-010	-052	2	081	067	097	079	84	+99	095	096
10	09	0068	0363	0408	04	22	2	99	99	00	00	03	069	075	311	+030	+020	+050	+010	2	064	061	062	074	87	+38	095	096
10	10	0068	0363	0408	05	30	3	99	99	00	00	03	083	059	255	+040	+000	+060	+033	2	065	061	081	058	83	+11	095	096

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City	School	District Title I ADM	District Total Title I $ Pre	District Total Title I $ Post	School ADM	School Mob.	Pov. Index	% Neg. Pre	% Neg. Post	% Span Spk Pre	% Span Spk Post	Grade	Grade ADM Pre	Grade ADM Post	Mean Reading Pre	Δ Mean (Post-Pre)	Δ 1st Decile	Δ Q1 (Post-Pre)	Δ Q3 (Post-Pre)		Std. Dev. Pre	Std. Dev. Post	Sam. Size Pre	Sam. Size Post	Gr. Att. Rate Pre	Gr. Δ Attend. Rate	Test Date Pre	Test Date Post
10	10	0068	0363	0408	05	30	3	99	99	00	00	05	070	069	390	-021	+015	-025	-039	2	060	050	064	064	96	-04	095	096
12	01	0003	0020	0070	01		3	56	56	00	00	03	025	026	459	-014	-030	-013	+005	1	092	092	025	026			095	096
12	02	0003	0020	0070	06	12	2	99	99	00	00	03	092	086	446	-005	+023	+002	-033	A	095	081	091	086	94	-33	095	106
12	03	0003	0020	0070	05	27	1	52	51	00	00	03	082	090	448	+005	+010	+000	+018	1	088	091	079	089	94	+03	095	096
12	04	0003	0020	0070	06		3	99	99	00	00	03	115	109	386	+031	+068	+037	+013	1	073	074	121	108			095	106
13	01	0028	0260	0221	08	79	1	08	11	14	16	01	125	126	403	-004	+000	+000	+000	1	087	079	123	124	97	-07	056	057
13	01	0028	0260	0221	08	79	1	08	11	14	16	02	117	108	422	+018	+000	+027	+015	1	081	089	106	104	97	-07	056	057
13	01	0028	0260	0221	08	79	1	08	11	14	16	05	087	111	482	-013	+000	+014	-028	1	082	065	074	067	97	-07	105	106
13	01	0028	0260	0221	08	79	1	08	11	14	16	06	102	093	411	+017	-016	-004	+035	A	074	086	108	094	97	-07	016	106
13	02	0028	0260	0221	06	77	1	24	25	21	23	01	104	085	381	+041	+076	+023	+034	1	079	080	100	082	96	+11	056	057
13	02	0028	0260	0221	06	77	1	24	25	21	23	02	081	087	406	-004	-028	+005	-004	1	081	084	074	084	96	+11	056	057
13	02	0028	0260	0221	06	77	1	24	25	21	23	05	062	067	469	-031	-010	-003	-042	1	081	065	052	054	96	+11	105	106
13	02	0028	0260	0221	06	77	1	24	25	21	23	06	062	048	380	+050	+089	+064	+041	A	077	070	063	050	96	+11	016	106
13	03	0028	0260	0221	05	61	2	56	56	11	13	01	096	115	412	+044	+000	+023	+091	1	078	109	062	099	96	+00	056	057
13	03	0028	0260	0221	05	61	2	56	56	11	13	02	075	081	438	+007	-010	-011	+002	1	078	097	064	078	96	+00	056	057
13	03	0028	0260	0221	05	61	2	56	56	11	13	05	054	051	473	-032	-019	-025	-022	1	082	055	048	037	96	+00	105	106
13	03	0028	0260	0221	05	61	2	56	56	11	13	06	050	040	363	+053	+032	+041	+058	A	059	089	050	042	96	+00	016	106

TOTAL DATA BY CITY, SCHOOL, AND GRADE

City	School	District Title I ADM	District Total Title I $ Pre	District Total Title I $ Post	School ADM	School Mob.	Pov. Index	% Neg. Pre	% Neg. Post	% Span Spk Pre	% Span Spk Post	Grade	Grade ADM Pre	Grade ADM Post	Mean Reading Pre	Δ Mean (Post-Pre)	Δ 1st Decile	Δ Q1 (Post-Pre)	Δ Q3 (Post-Pre)		Std. Dev, Pre	Std. Dev, Post	Sam. Size Pre	Sam. Size Post	Gr. Att. Rate Pre	Gr. Δ Attend. Rate	Test Date Pre	Test Date Post
13	04	0028	0260	0221	08	56	2	80	85	12	09	01	154	146	403	-024	-028	-035	-031	1	087	082	120	110	96	+02	056	057
13	04	0028	0260	0221	08	56	2	80	85	12	09	02	104	113	401	+018	+030	+000	+019	1	076	084	096	098	96	+02	056	057
13	04	0028	0260	0221	08	56	2	80	85	12	09	05	076	101	454	+017	+050	+000	+007	1	074	064	062	074	96	+02	105	106
13	04	0028	0260	0221	08	56	2	80	85	12	09	06	080	081	359	+031	+041	+044	+049	A	063	059	079	078	96	+02	016	106
13	05	0028	0260	0221	04	39	3	11	11	84	88	01	053	061	374	+019	+056	+058	+000	1	081	066	024	039	97	-10	056	057
13	05	0028	0260	0221	04	39	3	11	11	84	88	02	043	038	366	+047	+012	+040	+056	1	073	087	039	033	97	-10	056	057
13	05	0028	0260	0221	04	39	3	11	11	84	88	05	054	061	438	-011	-047	+000	-012	1	064	072	033	033	97	-10	105	106
13	05	0028	0260	0221	04	39	3	11	11	84	88	06	046	045	379	+008	+044	+024	-004	A	067	055	034	041	97	-10	016	106
13	06	0028	0260	0221	08	78	3	44	44	40	43	01	121	136	369	+015	-021	+000	+046	1	046	070	096	112	96	-04	056	057
13	06	0028	0260	0221	08	78	3	44	44	40	43	02	093	097	385	+018	+028	+000	+033	1	082	086	086	101	96	-04	056	057
13	06	0028	0260	0221	08	78	3	44	44	40	43	05	106	109	438	+000	+078	-014	+000	1	082	078	079	069	96	-04	105	106
13	06	0028	0260	0221	08	78	3	44	44	40	43	06	100	110	376	+006	+024	-004	+013	A	066	073	082	091	96	-04	016	106
13	07	0028	0260	0221	08	56	3	91	92	07	08	01	150	135	396	+047	+076	+000	+071	1	074	109	108	094	96	-14	056	057
13	07	0028	0260	0221	08	56	3	91	92	07	08	02	095	088	386	+006	-028	+000	+030	1	071	088	090	082	96	-14	056	057
13	07	0028	0260	0221	08	56	3	91	92	07	08	05	061	071	461	-034	-079	-007	-039	1	086	068	059	021	96	-14	105	106
13	07	0028	0260	0221	08	56	3	91	92	07	08	06	062	058	361	+053	+041	+034	+065	A	062	083	062	062	96	-14	016	106
13	08	0028	0260	0221	11	38	2	70	74	14	14	08	329	306	394	+030	+025	+037	+028	1	083	086	311	281	97	+01	115	106
13	09	0028	0260	0221	16	46	3	59	57	32	35	08	443	420	397	+010	+017	+015	+005	1	078	075	390	350	95	-11	115	106
13	10	0028	0260	0221	14	32	2	69	74	16	17	11	429	362	438	-009	+005	+000	-012	1	084	087	407	366	98	-09	105	106

TOTAL DATA BY CITY, SCHOOL, AND GRADE

City	School	District Title I ADM	District Total Title I $ Pre	District Total Title I $ Post	School ADM	School Mob.	Pov. Index	% Neg. Pre	% Neg. Post	% Span Spk Pre	% Span Spk Post	Grade	Grade ADM Pre	Grade ADM Post	Mean Reading Pre	Δ Mean (Post-Pre)	Δ 1st Decile	Δ Q_1 (Post-Pre)	Δ Q_3 (Post-Pre)		Std. Dev. Pre	Std. Dev. Post	Sam. Size Pre	Sam. Size Post	Gr. Att. Rate Pre	Gr. Δ Attend. Rate	Test Date Pre	Test Date Post
13	11	0028	0260	0221	19	16	3	23	22	23	25	11	589	588	490	-021	-017	-037	-030	1	103	100	522	564	98	-05	105	106
14	01	0032	0146	0133	07	45	3	77	81	00	00	03	097	080	360	+004	-020	+000	+010	1	065	075	104	075	92	-16	105	106
14	01	0032	0146	0133	07	45	3	77	81	00	00	04	067	084	417	+000	+004	-025	+010	1	076	083	089	083	92	-16	105	106
14	01	0032	0146	0133	07	45	3	77	81	00	00	06	084	075	435	+001	+000	-018	-020	1	088	094	064	069	92	-16	105	106
14	02	0032	0146	0133	07	32	3	04	03	00	00	03	085	111	365	+021	+010	+057	-008	1	095	087	100	103	93	-12	105	106
14	02	0032	0146	0133	07	32	3	04	03	00	00	04	099	096	460	-011	-005	-010	-015	1	094	097	074	089	93	-12	105	106
14	02	0032	0146	0133	07	32	3	04	03	00	00	06	075	088	470	+004	+014	+010	+025	1	094	101	067	070	93	-12	105	106
14	03	0032	0146	0133	08	16	3	44	42	00	00	03	082	087	376	-017	-032	-010	-010	1	081	081	089	078	94	-04	105	106
14	03	0032	0146	0133	08	16	3	44	42	00	00	04	078	094	440	-001	+030	-005	-010	1	095	085	069	085	94	-04	105	106
14	03	0032	0146	0133	08	16	3	44	42	00	00	06	079	075	430	-020	+020	-010	-062	1	112	088	081	064	94	-04	105	106
14	04	0032	0146	0133	09	30	3	32	29	00	00	03	097	090	380	-006	+038	+000	-025	1	073	066	081	085	91	+04	105	106
14	04	0032	0146	0133	09	30	3	32	29	00	00	04	107	085	407	+039	+090	+040	+048	A	091	070	084	080	91	+04	105	106
14	04	0032	0146	0133	09	30	3	32	29	00	00	06	072	089	426	-002	-010	-010	-010	1	080	099	077	076	91	+04	105	106
14	05	0032	0146	0133	02	35	3	97	96	00	00	03	066	035	344	+003	+000	-020	+000	1	060	072	033	035	94	-01	105	106
14	05	0032	0146	0133	02	35	3	97	96	00	00	04	059	036	391	+005	+036	+020	+010	1	079	062	033	031	94	-01	105	106
14	05	0032	0146	0133	02	35	3	97	96	00	00	06	060	023	413	-005	+006	-020	+025	1	090	073	039	021	94	-01	105	106
14	06	0032	0146	0133	08	39	3	83	84	00	00	03	094	085	381	+013	+010	-025	+025	1	085	081	081	066	93	-08	105	106
14	06	0032	0146	0133	08	39	3	83	84	00	00	04	085	103	428	-017	-010	-040	-020	1	083	077	083	078	93	-08	105	106

TOTAL DATA BY CITY, SCHOOL, AND GRADE

City	School	District Title I ADM	District Total Title I $ Pre	District Total Title I $ Post	School ADM	School Mob.	Pov. Index	% Neg. Pre	% Neg. Post	% Span Spk Pre	% Span Spk Post	Grade	Grade ADM Pre	Grade ADM Post	Mean Reading Pre	Δ Mean (Post-Pre)	Δ 1st Decile	Δ Q_1 (Post-Pre)	Δ Q_3 (Post-Pre)		Std. Dev, Pre	Std. Dev, Post	Sam. Size Pre	Sam. Size Post	Gr. Att. Rate Pre	Gr. Δ Attend. Rate	Test Date Pre	Test Date Post
14	06	0032	0146	0133	08	39	3	83	84	00	00	06	081	097	422	-009	-010	-020	-020	1	095	097	072	088	93	-08	105	106

TOTAL DATA BY CITY, SCHOOL, AND GRADE

APPENDIX B

DESCRIPTION OF VARIABLES

Because school districts vary in their administrative procedures and classifications, identical forms of information for all districts could not be obtained. There was, therefore, some variation in the types of material included under any particular definition. For example, total Title I funds may be based upon budgeted amounts or expenditures; mobility may be calculated during just the academic year or for a calendar year; etc. The definitions which follow represent the kinds of information we desired to obtain, and the figures used in this report should be interpreted as approximations which may vary somewhat among districts.

Variables	Description
District Title I ADM	The average daily membership of all schools (public and parochial) in the district receiving Title I funds. Usually this figure was obtained from application forms for Title I.
District Total Title I $ 1965-66	Expenditures (or budget) for Title I from February through August 1966.
District Total Title I $ 1966-67	Expenditures (or budget) for Title I from September 1966 through May 1967.
Grade	The school system classification of grade used for interpreting achievement results. Some non-graded classes with their appropriate grade levels were included but most special classes for mentally retarded were excluded.

Variables	Description
% Negro 1965-66 % Negro 1966-67	The percentage of the students in a school identified as Negro in the districts' racial census. In cases where no formal census was done, estimates by district personnel were used.
% Spanish Speaking 1965-66 % Spanish Speaking 1966-67	District census estimates of the percent of the school population which comes from families where the primary language in the home is Spanish and for which it is reasonable to assume that school performance is hampered by an inadequate knowledge of English.
Mean Achievement Test Score - pre	The Mean Standard T score in the reading subtest or composite achievement test by a specific grade at a particular school in academic year 1965-66.
Mean Achievement Test Score - post	As above for academic year 1966-67.
Change in Mean Achievement Test Score	Mean Achievement Test Score post minus Mean Achievement Test score pre.
Change in 1st decile, 1st quartile, and 3rd quartile	As above, for the respective points in the achievement test score distributions.
Sample Size 1965-66 Sample Size 1966-67	The number of pupils in a grade at a given school for whom achievement test data were obtained in 1965-66 (pre) and 1966-67 (post).
Attendance Rate (ADA/ADM)	Average Daily Attendance (pupil days attended divided by number of days school is in session) divided by ADM.
Change in Attendance Rate	Attendance rate in 1966-67 minus attendance rate in 1965-66.

Variables	Description
Test Date	Month and year achievement tests were administered to a given grade.
School ADM; Grade ADM	The Average Daily Membership (1965-66); as defined by the Office of Education (Reference 11); aggregate days membership divided by number of days school is in session. In some cases enrollment figures were substituted.
School Mobility	The sum of (a) total number of students entering the school after formal opening of the school years, and (b) total number of students leaving the school during the school year, the sum then divided by the school ADM. (If information required for this definition was not available, substitute measures were used.)
Poverty Index	A ranking of Low (1), Medium (2), or High (3) to indicate how each school compares to other Title I schools in a school district. (High means greatest degree of poverty.)
Average Title I dollars per Pupil	District total Title I dollars 1965-66 plus K times (District Total Title I dollars 1966-67) divided by District Title I ADM, where K is the fraction of the 1966-67 academic year that elapsed by the 1966-67 test date for that grade.
Weighted Averages	The observed values of changes in the means (ΔX), the 1st deciles (ΔD_1), and the quartiles (ΔQ) are weighted by the average number of pupils in the pre and post year.

$$\text{weighted average} = \sum_{i=1}^{n} \frac{(m_1 + m_2)_i}{\sum_{i=1}^{n} (m_1 + m_2)_i} [\text{change in achievement}]_i$$

where m_1 and m_2 are the number of pupils in 1965-66 and 1966-67 respectively (in the ith observation). The sum of the weights add to one.

APPENDIX C

STATISTICAL MODELS FOR ANALYSIS OF ACHIEVEMENT DATA

CONFIDENCE INTERVALS FOR OBSERVATION BY GRADE

The confidence intervals for Δ mean are based on the fact that regardless of the form of the underlying distribution, the distribution of the sample mean is approximately normal for large samples. Let $\overline{X}_0$ and $\overline{X}_1$ be the sample means in two successive years (Pre and Post) for a particular grade and school, computed from samples of sizes n_0 and n_1, respectively. Let $\Delta\overline{X} = \Delta\overline{X}_1 - \overline{X}_0$. Then, assuming independence of $\overline{X}_1$ and $\overline{X}_0$ (they represent two different groups of individuals) ΔX will be normally distributed with mean δ and variance $\sigma^2/n_0 + \sigma^2/n_1 = \sigma^2 (1/n_0 + 1/n_1)$ where δ is the true difference in the means, and σ^2 is the (assumed) common variance. (The assumption of common variances seems reasonable after observing the small variation of the sample variances, as shown in the raw data. Then, a 90 percent confidence interval for the true difference δ is equal to $\Delta\overline{X} \pm 1.65\, s\, (1/n_0 + 1/n_1)^{1/2}$, where s is the pooled estimate of σ, given by

$$s = \left[\frac{(n_0 - 1)\, s_0^2 + (n_1 - 1)\, s_1^2}{n_0 + n_1 - 2} \right]^{1/2} \tag{1}$$

where s_0^2 and s_1^2 are the pre and post sample variances, respectively. The pooled sample sizes are never less than 30, and usually much larger.

Approximate confidence intervals for Δ 1st decile (Δd_1) and Δ 1st quartile (Δq_1) are computed from the Chebyshev inequality, and by estimating the standard deviations of the first decile and first quartile from the equations by

$$S_{d_1} = (1.7094) s / n^{1/2} \tag{2}$$

and

$$S_{q_1} = (1.3626) S / n^{1/2} \tag{3}$$

respectively.* Thus, proceeding as with the Δ mean above, $\Delta d_1 = \Delta d_{11} - \Delta d_{10}$ (the Post-Pre difference) has a true mean d and variance

$$\sigma^2_{d_1} = (1.7094)^2 \; \sigma^2 \; (1/n_0 + 1/n_1) \tag{4}$$

Writing Chebyshev's inequality in the form

$$P \left[\left| \Delta d_1 - d \right| \geq \lambda \, \sigma \right] \leq \frac{1}{\lambda^2},$$

and choosing λ so that $1/\lambda^2 = 0.1$ (i.e., $\lambda = \sqrt{10}$), the approximate 90 percent confidence interval for Δd_1 is

$$\Delta d_1 \pm \sqrt{10} \; (1.7094) \; s \; (1/n_0 + 1/n_1)^{1/2} , \tag{5}$$

where s is the pooled estimate given by (1) above. The confidence interval for Δq_1 is identical except for the constant 1.3626 in place of 1.7094:

$$\Delta q_1 \pm \sqrt{10} \; (1.3626) \; s \; (1/n_0 + 1/n_1)^{1/2} \tag{6}$$

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[*] See Reference 12, p. 243, for the origin of the two numerical constants.

RATIONALE AND MODELS FOR MULTIVARIATE ANALYSES

Multiple regression and analysis of covariance were the two multivariate analyses used in Phase I. They are important tools in analysis of non-experimental data. They are expecially helpful when there are large differences in so-called environmental conditions among sample observations. These techniques not only help to identify the effect of specific environmental conditions on the variable of prime interest but they help to reduce sampling variation and, thereby, make tests for statistical significance more discriminating.

The regression model used in Phase I, namely

$$Y = a_0 + a_1 (\$) + a_2 (M) + a_3 (\%N) + a_4 (L) + a_5 (A) + \epsilon \quad (7)$$

has major limitations because of the different levels of aggregation on data for the different variables. The dependent variable (Y) was measured at the grade level and was defined as change in mean achievement score or change in reading more at the lowest decile, lowest quartile, or highest quartile. The Title I dollars per student were computed from average dollars per student for an entire school district. The mobility rate (M) and percent Negro (%N) were computed for the entire school. The initial achievement level (L) is the average score for a specified grade in the 1965-66 test. The attendance rate (A) was computed for the entire school.

For the variables which were measured at the school or district level the observations by grade are, obviously, not independent. This violates one of the assumptions in regression analysis and it means that less confidence can be placed on the estimated regression coefficients. For example the coefficient on the $ variable in Tables 14 and 15 was, in essence, computed from seven observations, and not 240 as indicated by the number of grade observations. With only seven observations it is very likely that this variable is acting as a proxy variable and the estimated coefficient represents the effects of variables other than level of Title I expenditures.

When the model was estimated from data within a specific school district the dollars variable ($) was dropped. The mobility and attendance rate variables also had to be dropped in some cases because data were not available.

In analysis of covariance the variables M and A had to be deleted from the model in Equation 7 for the test of significant differences among schools in District 13. These variables are measured only at the school level. This means that there would be no variation within schools and it would not be possible to estimate the required statistics in analysis of covariance for testing significant differences among schools (see Table 44).

In analysis of covariance, the concepts of analysis of variance and regression are combined to provide a more discriminating analysis than is afforded by either of the two component parts. The F test in analysis of covariance is designed to determine if there is a significant difference in the adjusted means of the dependent variable among specified groups. The adjusted mean is calculated from the equation

$$\text{adj}\,(Y_i) = Y_i - \Sigma a_j X_j \quad , \tag{8}$$

where Y_i is the observed mean for the ith group, a_j are estimated regression coefficients, and X_j are the variables that are known to contribute to the variation in Y (see list of covariates in Tables 44 through 47).

In essence, the observed variation in the dependent variable among specified groups is divided into the three components: (1) variation due to the covariates (X_j), (2) variation due to factors associated with each group, and (3) variation due to the unknown random component. The F value in the F test is based on the ratio of the sum of the second and third components, to the third component. That is,

$$F = \frac{V_2 + V_3}{V_3} \tag{9}$$

and the value of F in Table 44, for example, was calculated as

$$F = 1.416 = \frac{4.57}{3.23} \tag{10}$$

In the example of Table 44, the F value is not significant at the 5 percent confidence level and we cannot reject the null hypothesis that the "school effect" contributes no significant influence on the

Table 44. Analysis of covariance[a]—District 13 schools (using change in lowest quartile as a measure of change in achievement).

Source	DF	YY	Sum-Squares (Due)	Sum-Squares (About)	DF	Mean-Square
Among Schools	10	65.5				
Error Within	21	132.4	71.0	61.4	19	3.23
(Total)	31	197.9	90.8	107.1	29	
Difference for testing adjusted treatment means				45.7	10	4.57

Null Hypothesis. No difference among schools after adjusting:

$F = 1.416 < F\ (5\%) = 3.43$

Note:

[a] For discussion of the use of covariance, see pages 34 and 163.

Table of Coefficients for Covariates:

Variable	Among Schools Coefficient	Error (Within)		
		Coefficient	Std. Error	T-Value
L	-0.409	-0.495	0.107	-4.65
$	-0.006	-0.025	0.012	-2.11

Note:
L is mean achievement level in 1965-66 and $ is effective Title I dollars per student (see definitions in Appendix B).

Table 45. Analysis of covariance[a]—seven school districts (using change in mean reading score as a measure of change in achievement).

Source	DF	YY	Sum-Squares (Due)	Sum-Squares (About)	DF	Mean Square
Among Districts	6	169.8				
Error (Within)	233	1214.3	350.7	863.6	230	3.76
(Total)	239	1384.2	434.0	950.3	236	
Difference for testing adjusted treatments means				86.6	6	14.4

Null Hypothesis. No difference among districts after adjusting:

$F = 3.85 > F\ (1\%) = 2.90$

Note:

[a] For discussion of the use of covariance, see pages 34 and 163.

Table of Coefficients for Covariates:

Variable	Among Schools Coefficient	Error (Within)		
		Coefficient	St. Error	T-Value
L	-0.170	-0.431	0.045	-9.52
A	0.158	0.078	0.062	1.25
$	0.013	-0.004	0.113	-0.34

Note:
L is mean achievement level in 1965-66, A is attendance rate, and $ is effective Title I dollars per student (see definitions in Appendix B).

Table 46. Analysis of covariance[a]—seven school districts (using change in lowest decile as a measure of change in achievement).

Source	DF	YY	Sum-Squares (Due)	Sum-Squares (About)	DF	Mean-Square
Among Districts	6	78.9				
Error (Within)	233	2366.9	253.6	2113.3	230	9.19
(Total)	239	2445.8	238.1	2207.6	236	
Difference for testing adjusted treatment means				94.4	6	15.7

Null Hypothesis. No difference among districts after adjusting:

$F = 1.71 < F\ (5\%) = 2.14$

Note:

[a] For discussion of the use of covariance, see pages 34 and 163.

Table of Coefficients for Covariates:

Variable	Among Schools Coefficient	Error (Within) Coefficient	St. Error	T-Value
L	-0.136	-0.371	0.071	-5.25
A	0.240	0.098	0.097	1.01
$	0.001	-0.019	0.018	-1.07

Note:
L is mean achievement level in 1965-66, A is attendance rate, and $ is effective Title I dollars per student (see definitions in Appendix B).

Table 47. Analysis of covariance[a]—seven school districts (using change in lowest quartile score as a measure of change in achievement).

Source	DF	YY	Sum-Squares (Due)	Sum-Squares (About)	DF	Mean-Square
Among Districts	6	105.0				
Error (Within)	233	1790.3	329.1	1461.2	230	6.35
(Total)	239	1895.3	334.9	1560.4	236	
Difference for testing adjusted treatment means				99.2	6	16.53

Null Hypothesis. No difference among districts after adjusting:

$F = 2.60 > F\ (5\%) = 2.14$

Note:

[a] For discussion of the use of covariance, see pages 34 and 163.

Table of Coefficients for Covariates:

Variable	Among Schools Coefficient	Error (Within) Coefficient	St. Error	T-Value
L	-0.149	-0.418	0.059	-6.31
A	0.164	0.050	0.081	2.54
$	0.009	-0.019	0.015	0.36

Note:
L is mean achievement level in 1965-66, A is attendance rate, and $ is effective Title dollars per student (see definitions in Appendix B).

dependent variable. By school effect we mean the net influence of all variables associated with school. The associated variables include such things as type of Title I program, school facilities, and quality of instruction.

In the analysis of covariance for the 11 schools in District 13, the amount of Title I dollars was not used for specifying different groups because the only information on expenditures was for the entire school district.

In the analysis of covariance for the seven school districts it would have been possible to specify different groups on the basis of expenditures. However, it seemed best to specify this as one of the variables in the regression equation (i. e., one of the X_j covariates in equation 7 above) since numerical values for observation on this variable are readily available. For variables such as type of Title I program which cannot be easily expressed in numerical form, specification of groups based on type of program and the use of analysis of covariance is an alternate to regression analysis.

The F values for Tables 44 through 47 are discussed in Section 2. It is advisable to consider more research in analysis of covariance in Phase II since time permitted only a few analyses in Phase I.

RESULTS FROM ANALYSIS OF VARIANCE AND ANALYSIS OF COVARIANCE

The summary of results from analysis of covariance were presented in Table 10 in the main text. Tables 44 through 47 give further details.

Table 48 shows the results from analysis of variance among school districts. The results from both the analysis of variance and analysis of covariance show a significant difference among school districts.

Table 48. Analysis of variance among school districts ($\Delta\overline{X}$).

	Sum of Squares	DF	Mean Square	F Ratio
Among Districts	185.04	10	18.50	3.77
Within Districts	1508.35	307	4.91	
Total	1693.39	317		

F = 3.77 > F (1%) = 2.37 indicating there *is* a significant difference in average change in the mean among school districts.

CORRECTION FOR EFFECT OF ERRORS OF MEASUREMENT ON OBSERVED CORRELATION BETWEEN INITIAL TEST SCORES AND CHANGES IN TEST SCORES

Errors of measurement produce a negative correlation between initial achievement level and change in achievement as measured, even if there is no true correlation. Similarly, any true correlation there may be, will be obscured in the analysis of observed data.

Let the observed initial value, x, represent the sum of the true value, x^*, and an error of measurement, e_1 .

$$x = x^* + e_1 \; . \qquad (11)$$

Similarly, let the measured final value, z, represent the sum of the true initial value, a true gain, g, and an error of measurement e_2.

$$z = x^* + g + e_2 \; . \qquad (12)$$

The observed difference between the two, $y = z - x$, becomes:

$$y = g + e_2 - e_1 \; . \qquad (13)$$

The reason for the apparent negative correlation between x and y, even if x^* and g are uncorrelated, is the presence of "$+e_1$" in the expression for x and "$-e_1$" in the expression for y.

Peters and Van Voorhis (Reference 13, p. 460) state that the magnitude of the correlation due simply to unreliability of measurement is

$$r_{x,y} = -\sqrt{1/2\,(1-r_x)}\ , \tag{14}$$

where r_x is the reliability of the instrument used in measuring x and z. This means that if there is no reliability to the instrument, a correlation of −0.7 will be found between initial level and observed gain, and that as reliability increases the correlation due to measurement error alone will drop.

Thomson (Reference 14, pp 321-324) provided the following formula to correct for errors of measurement:

$$r_{x*,g} = \frac{r_{xy} + \frac{\sigma_x}{\sigma_y}(1-r_x)}{\frac{1}{\sigma_y}\sqrt{r_x[\sigma_y^2 - \sigma_x^2(1-r_x) - \sigma_z^2(1-r_z)]}} \tag{15}$$

where, using the terminology in (11) through (13) above,

$$r_x = 1.0 - \frac{\sigma_{e_1}^2}{\sigma_x^2} \tag{16}$$

$$r_z = 1.0 - \frac{\sigma_{e_2}^2}{\sigma_z^2}\ . \tag{17}$$

The Thomson formula requires estimates of the reliability of the measuring instrument and measures of the variance of initial value, (x) final value (z) and gain (y). At the present state of our study there is no measure of the reliability of the test instrument for measuring achievement of school-grade units. In spite of the lack of such estimates, it was desired to see how the measured fairly high negative correlation between initial mean achievement level and change in the mean (i.e., −0.43 for the total of 314 observations) would be altered when corrected for errors of measurement of various orders. For these calculations, it was assumed that e_1 and e_2 are not correlated with each other or with x^* or g.

Using Thomson's formula the "true" correlation between initial mean achievement level and gain was calculated for various assumed levels of reliability of test instrument for grade-level observations (see Table 49).

Calculations using reliability values of 0.85 or less yielded values greater than 1.00 or imaginary numbers, suggesting that such an assumption was incompatible with the observed values of variances or the assumption that x^*, g, e_1, and e_2 are uncorrelated. For reliability between 0.9 and 1.0 the correlation between the true gain and true initial level differs only slightly from the −0.43 coefficient between the observed measures. It appears that the observed fairly high negative correlations between initial level and gain in mean achievement scores cannot be attributed to an artifact of test unreliability, but should be accepted as indicating a true negative relationship.

Table 49. Relation between assumed reliability values of estimates of mean test scores and "true" correlation between initial level and gain (when measured correlation is -0.43).

Assumed Reliability of Pre and Post Tests	"True" Correlation Between Initial Achievement Level and Gain
1.00	-0.43
0.98	-0.42
0.95	-0.41
0.90	-0.40
≤0.85	Assumption not consistent with observed values of variances

VARIANCE OF WEIGHTED AVERAGES

The formula for the variance of a simple average where each observation is given equal weight is

$$V = \sum_{i=1}^{n} \frac{[x_i - \bar{x}]^2}{n - 1} , \tag{18}$$

where n is the number of observations (x_i).

The estimated variance for a weighted average such as

$$\bar{x} = \sum_{i=1}^{m} b_i x_i \tag{19}$$

is given by the formula

$$V = \sum_{i=1}^{n} [b_i]^2 \sigma^2(x_i) . \tag{20}$$

In this study the x_i is a parameter of a distribution of scores from m_i pupils.

The variance $\sigma^2(x_i)$ can be represented as

$$\sigma^2(x_i) = \frac{\sigma^2}{m_i} , \tag{21}$$

where m_i is the number of pupils and σ^2 is a constant for all observations on the n sets of pupils. The b_i and m_i are known and it is only necessary to estimate σ^2 in order to use formula (20).

We know that each value of

$$m_i [x_i - \bar{x}]^2 \tag{22}$$

is an estimate of σ^2 . Therefore the best estimate of σ^2 is

$$\hat{\sigma}^2 = \sum_{i=1}^{n} \frac{m_i [x_i - \bar{x}]^2}{n} \tag{23}$$

where n is the number of observations of sets of pupils.

The standard errors reported for weighted averages in Tables 6 and 9 were computed by substituting the value of $\hat{\sigma}^2$ from Equation 23 into Equation 21 and substituting the values from Equation 21 into Equation 20.

APPENDIX D

SPECIFICATIONS OF ACHIEVEMENT TEST DATA

The following tables describe, for four school districts (1, 3, 4 and 13), the form of the achievement test data obtained and the steps necessary to convert them into national percentile scores. The sources used for conversion were usually norms or equivalence tables provided by the publishers of the particular tests. In each conversion process the last step was conversion of percentile scores into Standard T scores (see Appendix F). Corresponding information for the remaining cities is available but has not been included.

The following is a list of abbreviations and terms used in Tables 50 through 53:

Type of Test:

ITBS — Iowa Tests of Basic Skills

ITED — Iowa Tests of Educational Development

MAT — Metropolitan Achievement Tests

SAT — Stanford Achievement Test

STEP — Sequential Tests of Educational Progress

Reading — A subtest of the MAT, ITBS, and STEP

Para. Mng. — Paragraph Meaning subtest of the SAT

Composite — A summary score for several subtests used on the ITED and ITBS

Ability to interpret literary materials — A subtest of the ITED

Forms and Batteries of Tests:

Pri. — Primary battery

Int. — Intermediate battery

Adv. — Advanced battery

Numbers and letters refer to specific forms.

Types of Scores

Converted scores — A statistically derived score used on the STEP in order to make scores from different forms of the STEP comparable.

Grade score, Grade Equivalence or GE — Scores reflecting the grade placement of pupils for whom the given score is the average or norm.

Percentile score — A score or rank indicating the percentage of pupils in the standardization group at the given grade placement having scores less than the given score.

Raw score — The number of correct answers in a test.

Standard scores — A raw score used on the ITED which was constructed to have a median of 15 and standard deviation of 10. With the passage of time, this standard no longer applies uniformly.

Standard T-score — A score representing the placement of the individual in a norm population of normally distributed scores around a mean of 50 and standard deviation of 10.

Table 50. Preparation of District 1 achievement test data.

Grade	Test & Subtest	Form Used		Month Tested		Form of Data		Conversion Process Prior to Obtaining Standard T-Scores			
								Step 1		Step 2	
		Pre	Post	Pre	Post	Pre	Post	Product	Source	Product	Source
4	SAT Paragraph Meaning	Int. I-X	Int. I-X	Late May	April 24 -May 5	Grade Scores	Grade Scores	%ile Scores	Year-end Norms		
5	SAT Paragraph Meaning	Int. II-X	Int. I-W	Late May	March 6-17	Grade Scores	Grade Scores	%ile Scores (Pre)	Year-end Norms	%ile Scores (Post)	Mid-year Norms
6	SAT Paragraph Meaning	Int. II-X	Int. II-Y	Feb.	Jan.	Grade Scores	Raw Scores	Grade Scores (Post)	Grade Score Table	%ile Scores	Mid-year Norms
7	SAT Paragraph Meaning	Adv. W	Adv. X	Late May	April 24 -May 5	Grade Scores	Raw Scores	Grade Scores (Post)	Grade Score Table	%ile Scores	Year-end Norms
8	SAT Paragraph Meaning	Adv. W	Adv. X	Late May	Dec. 5-17	Grade[a] Scores	Raw Scores	Grade Scores (Post)	Grade Score Table	%ile Scores	Beginning & Year-end Norms

Note:

[a] In 1966-67 College Preparatory classes were not tested. To make groups comparable, students in these classes in 1965-66 were eliminated from the eighth grade data.

Table 51. Preparation of District 3 achievement test data.

Grades	Test & Subtest	Form Used		Month Tested		Form of Data		Conversion Process Prior to Standard T-Scores	
		Pre	Post	Pre	Post	Pre	Post	Product	Source
4, 6, 8	ITBS Composite	3	4	Jan.	Jan.	Grade equiv. state norms[a]	%ile scores nat'l. norms	1965-66 data to nat'l. %ile norms	Mid-year tables of nat'l. GE & %ile norms
10, 12	ITED Composite	Y-4	X-4	Sept.	Sept.	%ile scores nat'l. norms	%ile scores nat'l. norms	none	none

Note:

[a] Grade equivalent scores were listed in scoring intervals; midpoints of the scoring intervals were used.

Table 52. Preparation of District 4 achievement test data.

Grades	Test & Subtest	Form Used		Month Tested		Form of Data	Conversion Process Prior to Obtaining Standard T-Scores	
		Pre	Post	Pre	Post		Product	Source
4B, 6B,	ITBS Reading	4	4	Oct.	Oct.	Grade equiva-	National %ile scores	National norms, beginning of year
10B, 12B	STEP Reading	?	?	Oct.	Oct.	Converted scores	National %ile scores	National norms, beginning of year[a]

Note:

[a] Midpoints of percentile intervals were used.

Table 53. Preparation of District 13 achievement test data.

							Conversion Process Prior to Obtaining Standard T-Scores					
							Step 1		Step 2		Step 3	
Grade	Test & Subtest	Form Used Pre	Form Used Post	Month Tested Pre	Month Tested Post	Form of Data	Product	Source	Product	Source	Product	Source
1	SAT Paragraph Meaning	Pri. I-W	Pri. I-W	May	May	Raw Scores	Grade Scores	Subtest Conversion Table	National %ile Scores	May-June Norms		
2	SAT Paragraph Meaning	Pri. II-W	Pri. II-W	May	May	Raw Scores	Grade Scores	Subtest Conversion Table	National %ile Scores	May-June Norms		
5	STEP Reading	4A	4A	Oct.	Oct.	Number of correct answers	Converted Scores	Subtest Conversion Table	National %ile Scores[a]	Fall Norms		
6	SAT Paragraph Meaning	Int. KM	Int. II-W	Jan.	Oct.	Raw Scores	Grade Scores	Subtest Conversion Table	1964 Edition grade score equiv. for Form K	Edition-equiv. Tables[b]	National %ile Scores	Jan-April & Sept.-Dec. Norms[c] (Int. II)
8	SAT Paragraph Meaning	Adv. JM	Adv. W	Oct.-Nov.	Oct.	Raw Scores	Grade Scores	Subtest Conversion Table	As above for Form J	Edition-equiv. Tables[b]	National %ile Scores	Sept.-Dec. Norms (Adv. W)
11	ITED--"Ability to interpret literary materials"	X4S	X4S	Oct.	Oct.	Standard Scores	National %ile Scores	Beginning of year norms				

Notes:

[a] Midpoints of percentile intervals were used.

[b] Since different months were involved, different norm tables had to be used.

[c] Forms KM and JM are 1953 edition tests and Form W a 1964 edition: equivalence between the two editions required use of special tables.

APPENDIX E

CORRECTIONS FOR DIFFERENCES IN PRE-POST TESTING DATES

In a number of instances, achievement tests were administered at somewhat different times in the pre and post years. These differences generate systematic errors in observations of change in achievement. Achievement test publishers provide norms for only a few different times of year; for example, the Stanford Achievement Test (SAT) has beginning-of-year norms (for September through December), middle-of-year norms (January through April), and end-of-year norms (May and June). These norms are usually obtained by interpolating between the results from pupils in different grades, rather than actually determining separate norms for various times of year. No distinction is made between tests administered at different times within the interval covered by the norming period. This is consistent with the recognized crudeness of achievement test scores for individuals. Indeed, publishers carefully point out that the scores for individuals are quite imprecise. However, for group comparisons which accumulate errors from individual scores, more precision is needed. As an example, if pre-year testing is done in January and post-year testing in April, the same norms (middle-of-year) would be used to score both sets of results. However, the post year results would then contain a positive bias and the pre-year results a negative bias. To determine the extent of errors introduced by differences in time of year, all cases where there were three or more weeks discrepancy between pre and post testing dates were examined. These instances and the factors required for correction are shown in Table 54. The amount of correction needed was obtained by applying the appropriate "change per month" (shown in the last column of Tables 55 through 58 and calculated by interpolating in the appropriate norm tables) to the discrepancy in test dates (shown in the "Time Difference" columns in Table 54). For example, the first entry in Table 54 shows a correction factor of +0.5. Notice that the SAT Int I was given at the end of the year to this fourth grade. The amount of change per month was calculated for both the fortieth and the twentieth percentile levels. These two points in the distribution were used to represent the relatively low scores in our sample and to diminish the effect of rounding errors. Table 56 shows the appropriate "change per month" as 0.5 at the fortieth percentile and 0.8 at the twentieth percentile; averaging these two numbers gives 0.65. From Table 54, the discrepancy in testing dates was three weeks or, approximately, 0.75 month. Therefore, the correction required is (0.65) x (0.75) = 0.5, as shown in the last column of the first line in Table 54.

Tables 57 and 58 are similar to Tables 55 and 56 but apply to the MAT Reading Test.

Table 59 shows average changes in achievement level before and after adjustment for differences in the pre-post testing dates for the four districts with differences of three or more weeks in test dates.

The adjustment produced noticeable change in the values for Districts 1 and 12, where the proportion of observations adjusted was high. In District 1, all cases were adjusted; in District 12, 25 percent of the cases were adjusted. The adjusting of scores is a likely source of error. As is shown in Table 59, adjustments for the 50 observations affected make the change more negative. However, this decrease is fairly small compared to the standard errors of the statistics.

Table 54. Bases for adjustment factors required by variations in dates between administration of pre and post tests.

District	Grade	Test (Subtest)	Date of Test in Acad. Yr.		Time Difference[a]	Score Difference[b]	Adjustment Factor[c]
			65-66	66-67			
1	4	SAT (PM) Int I	Late May	Apr. 24 May 5	3 weeks	-0.5	+0.5
1	5	SAT (PM) Int I, II	Late May	March 6-17	3 weeks	+0.4	-0.4
1	6	SAT (PM) Int II	Feb.	Jan.	1 month	-0.8	+0.8
1	7	SAT (PM) Adv.	Late May	Apr. 24 May 5	3 weeks	-0.2	+0.2
1	8	SAT (PM) Adv.	Late May	Dec. 5-17	1-1/2 months	+0.8	-0.8
8	11	MAT (Rdg) H.S.	Jan 7	May 15	4 months[d]	+0.9	-0.9
12[e]	3	MAT (Rdg) Pri II	Sept. 15	Oct. 5	3 weeks	+1.6	-1.6
13	6	SAT (PM) Int I, II	Jan.	Oct.	1 month	+0.4	-0.4

Notes:

[a] Difference is in reference to middle of norm period.

[b] Amount of Standard T-score difference favoring post test.

[c] Correction to be applied to observations (post minus pre).

[d] These data were based on a single norm for the 2 testings, rather than different time of year norms.

[e] Only one school (School 2) had a 3-week difference.

Table 55. Change from beginning of year to middle of year norms: SAT paragraph meaning.

Grade	Battery[a]	Percentile Score Level Beginning of Year	Equivalent Beginning-of-Year Grade Score	Equivalent Mid Year Percentile Score	Percentile Score Change Per Month[b]	Standard T Score Change Per Month
5	Int I	40	47	28	3	0.8
		20	39	12	2	0.8
6	Int II	40	56	29	2.8	0.8
		20	47	14	1.5	0.6
8	Adv.	40	75	32	2	0.5
		20	62	16	1	0.4

Notes:

[a] All are 1964 edition.

[b] Based on the 4-month period between mid-points of the two norm periods.

Table 56. Change from middle of year to end of year norms: SAT paragraph meaning.

Grade	Battery[a]	Percentile Score Level Beginning of Year	Equivalent Mid-Year Grade Score	Equivalent End of Year Percentile Score	Percentile Score Change Per Month[b]	Standard T Score Change Per Month
4	Int I	40	42	34	2	0.5
		20	34	14	2	0.8
5	Int II	40	52	36	1.3	0.4
		20	42	15	1.7	0.7
6	Int II	40	62	38	0.7	0.2
		20	50	18	0.7	0.3
7	Adv.	40	70	38	0.7	0.2
		20	58	18	0.7	0.3
8	Adv.	40	79	38	0.7	0.2
		20	65	18	0.7	0.3

Notes:

[a] All are 1964 edition since the 6th grade scores from the 1953 edition were converted into 1964 edition equivalents.

[b] Based on the 3-month period between midpoints of the two norm periods.

Table 57. Change from beginning of year norms to middle of year: MAT Reading[a].

Grade	Battery[a]	Percentile Score Level Beginning of Year	Equivalent Beginning-of-Year "Standard" Score	Equivalent Mid Year Percentile Score	Percentile Score Change Per Month[b]	Standard T-Score Change Per Month
3	Primary II	40	34	13.3	7.1	1.8
		20	29	4.4	4.2	1.5

Notes:

[a] The calculations for the Primary II battery were based upon the second grade level.

[b] Based on the 3-3/4 month period between midpoints of the norm intervals.

Table 58. Change from eleventh grade to twelfth grade norms: MAT Reading[a].

Grade	Battery	Percentile Score Level Mid-Year 11th Grade	Equivalent "Standard" Score	Equivalent %ile Score Mid-Year 12th Grade	Percentile Score Change Per Month	Standard T-Score Change Per Month
11	High School	40	52	31	0.9	0.26
		20	42	15	0.5	0.20

Note:

[a] Based on "age-controlled samples" tested annually. The year interval between tests is considered to consist of ten academic months.

Table 59. Adjusted average changes in districts where pre and post test dates differed by three or more weeks.

	DISTRICT			
	1	8	12	13
Number of Cases	39	55	4	32
Adjusted Cases	39	3	1	7
Average Change in Mean				
Unadjusted	0.27	-0.33	0.83	1.25
Adjusted	0.24	-0.38	0.43	1.16
Standard Error (unadj.)	0.30	0.27	1.07	0.48
Significance Level (unadj.)	0.35	0.22	0.45	0.01
Average Change in Lowest Decile				
Unadjusted	0.08	0.31	2.18	1.40
Adjusted	0.05	0.26	1.78	1.31
Standard Error (unadj.)	0.28	0.38	2.42	0.71
Significance Level (unadj.)	0.50	0.42	0.42	0.05

APPENDIX F

USE OF STANDARD T-SCORES

The Standard T-score was selected for the following reasons: the units of standard T-scores are nearly equal throughout the range of achievement levels for a given grade level; results from different tests can be converted to T-scores via tables provided by the Test publisher; test scores from different grades can be converted to the same T-score levels; test scores obtained at different times of the year can be converted to the same T-score units. None of the other measures has all of these qualities.

It is realized that test scores when converted to the Standard T-score have the above qualities only to a degree. The T-score is obtained by converting the raw score for a specific test to a national percentile rank and then converting the percentile rank to the Standard T-score. For example, a raw score of 11 on the test illustrated in Table 60 is equivalent to a "national" percentile rank of 8. As shown in Table 61 a national percentile of 8 is equivalent to a standard T-score of 36.0. One source of incompatibility among results from different tests is the fact that publishers use different populations for developing the conversion table to be used for transforming raw score to "national" percentile. That is, it is really a conversion to a percentile rank for the test population and not the entire nation.

It has been assumed that none of these factors has a serious effect on conclusions in this study, because of the following reasons: (1) there is no attempt to make comparisons of absolute scores since the differences from Pre to Post are the important observations; (2) the same rules were used in the conversion for both Pre and Post years, e.g., interpolation or extrapolation between values in conversion tables.

Tables 60 and 61 provide the reader with examples of the relationship between national percentile, Standard T-score, and grade equivalence. Any of the statistics on Standard T-scores provided in the summary tables of this report can be interpreted in terms of national percentiles by using Table 61. Table 60 provides a conversion from national percentiles to grade equivalence but for only the sixth grade in the latter part of the academic year.

Table 60. Conversion of raw score on Advanced Battery, Form W, of SAT to grade score and national percentile (for tests given in sixth grades during May & June of academic year)[a].

No. Right	Grade Score[b]	National Percentile[c]	No. Right	Grade Score[b]	National Percentile[c]
1	Below 20	Below 1	31	74	58
2	"	"	32	76	62
3	21	"	33	78	68
4	23	"	34	80	70
5	25	"	35	82	74
6	27	"	36	84	76
7	29	"	37	86	78
8	32	2	38	90	81
9	35	4	39	94	83
10	38	6	40	99	85
11	40	8	41	102	89
12	42	10	42	104	90
13	44	11	43	105	92
14	46	12	44	106	92
15	48	14	45	107	93
16	50	16	46	108	94
17	52	20	47	110	95
18	53	21	48	112	96
19	54	22	49	113	96
20	56	24	50	114	97
21	58	28	51	116	98
22	60	32	52	118	98
23	62	34	53	120	99
24	63	36	54	121	99
25	64	38	55	123	99
26	65	42	56	124	99
27	66	44	57	126	99
28	68	48	58	127	99
29	70	52	59	129	99
30	72	54	60	129+	99

Notes:

[a] All data are from publisher's tables accompanying test booklets.

[b] Grade score is 10 times grade equivalent score. For example, a grade equivalent of 6.0 is a grade score of 60.

[c] This national percentile rank is valid only for tests given to the 6th grade in May or June of the academic year.

Table 61. Converting percentiles to Standard T scores.[a]

%[b]	T[c]	%[b]	T[c]	%[b]	T[c]	%[b]	T[c]
1	26.7	26	43.6	51	50.3	76	57.1
2	29.5	27	43.9	52	50.5	77	57.4
3	31.2	28	44.2	53	50.7	78	57.7
4	32.5	29	44.5	54	51.0	79	58.1
5	33.5	30	44.7	55	51.3	80	58.4
6	34.5	31	45.0	56	51.5	81	58.8
7	35.2	32	45.4	57	51.8	82	59.2
8	36.0	33	45.6	58	52.0	83	59.5
9	36.6	34	45.9	59	52.3	84	59.9
10	37.2	35	46.2	60	52.5	85	60.4
11	37.7	36	46.4	61	52.8	86	60.8
12	38.3	37	46.7	62	53.0	87	61.3
13	38.7	38	47.0	63	53.3	88	61.7
14	39.2	39	47.2	64	53.6	89	62.3
15	39.6	40	47.5	65	53.8	90	62.8
16	40.1	41	47.7	66	54.1	91	63.4
17	40.5	42	48.0	67	54.4	92	64.0
18	40.8	43	48.3	68	54.7	93	64.8
19	41.2	44	48.5	69	55.0	94	65.6
20	41.6	45	48.7	70	55.3	95	66.5
21	41.9	46	49.0	71	55.5	96	67.5
22	42.3	47	49.3	72	55.8	97	68.8
23	42.6	48	49.5	73	56.1	90	70.3
24	42.9	49	49.7	74	56.4	99	70.5
25	43.3	50	50.0	75	56.7		

Notes:

[a] Reference 8, p 66.

[b] National percentile.

[c] Equivalent Standard T-Score.

APPENDIX G

DETAILED INFORMATION FOR DISTRICT 10

Tables 62 through 70 provide expenditure information for each of the 10 schools in District 10. Discussion of these tables and the corresponding Table for School 1 is in Section 3.

Tables 71 through 79 provide expenditure data by grade and type of CE program. Discussion of these tables and the corresponding Table for School 1 is in Section 3.

Table 62. Expenditures for regular and compensatory education programs: School 2.

District 10 School 02	Regular School Programs						Compensatory Education Programs							
Expenditure Categories							Teacher Aides Adjustment Teaching Reduced Class Size				Centralized Library			
	64-65		65-66		66-67		65-66		66-67		65-66		66-67	
	#	$	#	$	#	$	#	$	#	$	#	$	#	$
Principals, Consultants, Supervisors	1	8689	1	9362	1	12165		20						
Teachers	15	82091	15	84389	15	107774	5	3196	3	4736		1744		6910
Library, Audio-visual & TV Personnel								48						
Secretarial-Clerical	1	3024	1	3360	1	4070								
Total Salaries		93804		97111		124009		3264		4736		1744		6910
Teaching Supplies & Other Expenses		1024		1142		1062		967				1438		2796
Total Instructional Expenses		94828		98253		125071		4231		4736		3182		9706
Health Services														
Pupil Transportation														
Plant Operation & Maintenance		17771		15135		17490				53				353
Fixed Charges								126		206		109		484
Food Services														
Student/Community Activities														
Total Support Expenses		17771		15135		17490		126		259		109		837
Teaching Equipment						334		1122				4241		217
Total Expenses		112599		113388		142895		5479		4995		7532		10760

Table 63. Expenditures for regular and compensatory education programs: School 3.

District 10 School 03	Regular School Programs						Compensatory Education Programs							
Expenditure Categories							Teacher Aides Adjustment Teaching Reduced Class Size				Centralized Library			
	64-65		65-66		66-67		65-66		66-67		65-66		66-67	
	#	$	#	$	#	$	#	$	#	$	#	$	#	$
Principals, Consultants, Supervisors	1	10214	1	9391	1	13433		6						
Teachers	42	235839	42	250224	44	325019	13	9579	13	20306		1744		6810
Library, Audio-visual & TV Personnel								150						
Secretarial-Clerical	2	8098	2	8295	2	9200								
Total Salaries		254151		267910		347652		9735		20306		1744		6810
Teaching Supplies & Other Expenses		2988		2989		2726		2391				1544		2820
Total Instructional Expenses		257139		270899		350378		12126		20306		3288		9630
Health Services														
Pupil Transportation														
Plant Operation & Maintenance		34812		33491		41559				353				615
Fixed Charges												109		477
Food Services														
Student/Community Activities														
Total Support Expenses		34812		33491		41559				353		109		1092
Teaching Equipment						758		1946				4576		
Total Expenses		291951		304390		392695		14464		21544		7973		10722

Table 64. Expenditures for regular and compensatory education programs: School 4.

District 10 School 04	Regular School Programs						Compensatory Education Programs							
Expenditure Categories							Teacher Aides Adjustment Teaching Reduced Class Size							
	64-65		65-66		66-67		65-66		66-67		65-66		66-67	
	#	$	#	$	#	$	#	$	#	$	#	$	#	$
Principals, Consultants, Supervisors	1	7724	1	8384	1	11174		30						
Teachers	7	40031	7	42518	8	55621	3	1578	3	4658				
Library, Audio-visual & TV Personnel								83						
Secretarial-Clerical	1	3536	1	3623	1	4070		1691		4658				
Total Salaries		51291		54525		70865		1691		4658				
Teaching Supplies & Other Expenses		497		451		473		592						
Total Instructional Expenses		51788		54976		71338		2283		4658				
Health Services														
Pupil Transportation														
Plant Operation & Maintenance		9150		12255		10244								
Fixed Charges								67		203				
Food Services														
Student/Community Activities														
Total Support Expenses		9150		12255		10244		67		203				
Teaching Equipment						14		456						
Total Expenses		60938		67231		81596		2806		4861				

Table 65. Expenditures for regular and compensatory education programs: School 5.

District 10 School 05	Regular School Programs						Compensatory Education Programs							
Expenditure Categories							Teaching Aides Adjustment Teaching Reduced Class Size				Intensive Instructional Improvement			
	64-65		65-66		66-67		65-66		66-67		65-66		66-67	
	#	$	#	$	#	$	#	$	#	$	#	$	#	$
Principals, Consultants, Supervisors	1	10214	1	10743	1	13433		20						306
Teachers	42	233819	42	255857	42	326639	10	7750	17	27124				4675
Library, Audio-visual & TV Personnel								121						815
Secretarial-Clerical	2	7431	2	7864	2	9090								
Total Salaries		251464		274464		349162		7891		27124				5796
Teaching Supplies & Other Expenses		3155		2825		2524		1595		699				22
Total Instructional Expenses		254619		277289		351686		9486		27823				5818
Health Services														
Pupil Transportation														
Plant Operation & Maintenance		38017		32992		40684								
Fixed Charges								302		1182				374
Food Services														
Student/Community Activities														
Total Support Expenses		38017		32992		40684		302		1182				374
Teaching Equipment				100		501		1901		1389				297
Total Expenses		292636		310381		392871		11690		30394				6489

Table 66. Expenditures for regular and compensatory education programs: School 6.

District 10 School 06	Regular School Programs						Compensatory Education Programs							
Expenditure Categories							Teacher Aides Adjustment Teaching Reduced Class Size				Project Quality			
	64-65		65-66		66-67		65-66		66-67		65-66		66-67	
	#	$	#	$	#	$	#	$	#	$	#	$	#	$
Principals, Consultants, Supervisors	1	7120	1	8391	1	11174		30						
Teachers	9	47614	9	46151	9	62444	4	2556	4	6491				
Library, Audio-visual & TV Personnel								47						
Secretarial-Clerical	1	3280	1	3622	1	4070								
Total Salaries		58014		58164		77688		2633		6491				
Teaching Supplies & Other Expenses		415		1027		643		706		167				400
Total Instructional Expenses		58429		59191		78331		3339		6658				400
Health Services														
Pupil Transportation														
Plant Operation & Maintenance		9926		9229		14357				13				
Fixed Charges								103		333				
Food Services														
Student/Community Activities														
Total Support Expenses		9926		9229		14357		103		346				
Teaching Equipment						396		692		298				364
Total Expenses		68356		68420		93084		4134		7302				764

Table 67. Expenditures for regular and compensatory education programs: School 7.

District 10 School 07	Regular School Programs						Compensatory Education Programs							
Expenditure Categories							Teacher Aides Adjustment Teaching Reduced Class Size				English as Second Language			
	64-65		65-66		66-67		65-66		66-67		65-66		66-67	
	#	$	#	$	#	$	#	$	#	$	#	$	#	$
Principals, Consultants, Supervisors	1	8954	1	9306	1	12237		30				4196		7160
Teachers	10	54122	11	64714	11	86092	3	2091	2	2498		2625		4780
Library, Audio-visual & TV Personnel								24		348				
Secretarial-Clerical	1	4049	1	3623	1	2539						906		375
Total Salaries		67175		77643		100868		2145		2498		8075		12315
Teaching Supplies & Other Expenses		516		510		645		397		1422		203		
Total Instructional Expenses		67691		78153		101513		2542		3920		8278		12315
Health Services														
Pupil Transportation												70		5
Plant Operation & Maintenance		17021		12557		14879						45		
Fixed Charges								89		109		139		964
Food Services												290		
Student/Community Activities														
Total Support Expenses		17021		12557		14879		89		109		544		969
Teaching Equipment						106		653		252		859		518
Total Expenses		84713		90710		116498		3284		4281		9681		13802

Table 68. Expenditures for regular and compensatory education programs: School 8.

District 10 School 08	Regular School Programs						Compensatory Education Programs							
Expenditure Categories							Teacher Aides Adjustment Teaching Reduced Class Size				Intensive Instructional Improvement			
	64-65		65-66		66-67		65-66		66-67		65-66		66-67	
	#	$	#	$	#	$	#	$	#	$	#	$	#	$
Principals, Consultants, Supervisors	1	8996	1	8440	1	11327		20						785
Teachers	20	97757	21	108152	22	146285	5	3858	9	14021				2565
Library, Audio-visual & TV Personnel								63						
Secretarial-Clerical	1	4049	1	2968	1	4600								
Total Salaries		110802		119561		162212		3941		14021				3350
Teaching Supplies & Other Expenses		1495		1253		1482		738		398				
Total Instructional Expenses		112297		120814		163694		4679		14419				3350
Health Services														
Pupil Transportation														
Plant Operation & Maintenance		49683		19678		22766								
Fixed Charges								176		611				203
Food Services														
Student/Community Activities														
Total Support Expenses		49683		19678		22766		176		611				203
Teaching Equipment						341		1010		798				
Total Expenses		161981		140492		186801		5865		15828				3553

Table 69. Expenditures for regular and compensatory education programs: School 9.

District 10 School 09	Regular School Programs						Compensatory Education Programs							
Expenditure Categories							Teacher Aides Adjustment Teaching Reduced Class Size				Intensive Instructional Improvement			
	64-65		65-66		66-67		65-66		66-67		65-66		66-67	
	#	$	#	$	#	$	#	$	#	$	#	$	#	$
Principals, Consultants, Supervisors	1	8996	1	9370	1	11937		20						312
Teachers	16	102704	16	105282	18	148931	4	3230	5	7853				1565
Library, Audio-visual & TV Personnel								51						
Secretarial-Clarical	1	4049	1	4148	1	4600								
Total Salaries		115749		118800		165468		3301		7853				1877
Teaching Supplies & Other Expenses		1234		1067		998		687		199				
Total Instructional Expenses		116983		119867		166466		3988		8052				1877
Health Services														
Pupil Transportation														
Plant Operation & Maintenance		20552		15438		17380								
Fixed Charges								136		343				120
Food Services														
Student/Community Activities														
Total Support Expenses		20552		15438		17380		136		343				120
Teaching Equipment						10		707		397				
Total Expenses		137535		135305		183856		4831		8792				1997

Table 70. Expenditures for regular and compensatory education programs: School 10.

District 10 School 10	Regular School Programs						Compensatory Education Programs							
Expenditure Categories							Teacher Aides Adjustment Teaching Reduced Class Size							
	64-65		65-66		66-67		65-66		66-67		65-66		66-67	
	#	$	#	$	#	$	#	$	#	$	#	$	#	$
Principals, Consultants, Supervisors	1	8996	1	9670	1	11037		20						
Teachers	14	73606	14	79763	14	104810	4	3258	3	4661				
Library, Audio-visual & TV Personnel								39						
Secretarial-Clerical	1	3757	1	4148	1	5069								
Total Salaries		87359		93581		120916		3937		4661				
Teaching Supplies & Other Expenses		936		962		1109		620						
Total Instructional Expenses		88295		94543		122025		3937		4661				
Health Services														
Pupil Transportation														
Plant Operation & Maintenance		8649		8887		12089								
Fixed Charges								138		203				
Food Services														
Student/Community Activities														
Total Support Expenses		8649		8887		12089		138		203				
Teaching Equipment						359		779						
Total Expenses		95944		103430		134473		4854		4864				

Table 71. Program expenditures by grades: School 2.

1965-66		Regular Programs	Teacher Aides, Adjustment Teachers, Reduced Class Size	Central Library	Clinical Reading	Total CE Programs
Grade	ADM	$	$	$	$	$
K	56	10258	1112	681		1793
1	144	26377	2858	1752		4610
2	76	13922	1508	925		2433
3	68	12456		827	2604	3431
4	65	11907		791	2604	3395
5	80	14654		973	2604	3577
6	58	10624		706	2604	3310
Sp.	72	13189		876		876
Totals	619	109781	5478	7531	10416	23425

1966-67		Regular Programs	Teacher Aides, Adjustment Teachers, Reduced Class Size	Central Library	Clinical Reading	Total CE Programs
Grade	ADM	$	$	$	$	$
K	64	16936	1137	1275		2412
1	110	29108	1955	2192		4147
2	107	28313	1902	2132		4034
3	60	15877		1195	5048	7243
4	62	16406		1235	5048	6283
5	63	16670		1256	5048	6304
6	59	15613		1176	5048	6224
Sp.	15	3970		299		299
Totals	540	142893	4994	10760	20192	36946

Table 72. Program expenditures by grades: School 3.

1965–66		Regular Programs	Teacher Aides, Adjustment Teachers, Reduced Class Size	Central Library		Total CE Programs
Grade	ADM	$	$	$		$
K	116	21825	2534	572		3106
1	301	56617	6574	1483		8057
2	245	46085	5352	1207		6559
3	210	39510		1035		1035
4	198	37257		976		976
5	169	31778		832		832
6	163	30652		803		803
Sp.	216	40636		1064		1064
Totals	1618	304360	14460	7972		22432

1966–67		Regular Programs	Teacher Aides, Adjustment Teachers, Reduced Class Size	Central Library		Total CE Programs
Grade	ADM	$	$	$		$
K	142	39623	4990	1082		6072
1	227	63342	7976	1729		9705
2	244	68093	8575	1859		10434
3	177	49401		1349		1349
4	192	53603		1464		1464
5	146	40762		1113		1113
6	137	38248		1044		1044
Sp.	142	39629		1082		1082
Totals	1407	392701	21541	10722		32263

Table 73. Program expenditures by grades: School 4.

1965-66		Regular Programs	Teacher Aides, Adjustment Teachers, Reduced Class Size			Total CE Programs
Grade	ADM	$	$			$
K	40	9638	857			857
1	48	11566	1028			1028
2	43	10362	921			921
3	29	6988				
4	21	5060				
5	21	5060				
6	28	6747				
Sp.	49	11808				
Totals	279	67229	2806			2806

1966-67		Regular Programs	Teacher Aides, Adjustment Teachers, Reduced Class Size			Total CE Programs
Grade	ADM	$	$			$
K	43	14206	1620			1620
1	41	13545	1545			1545
2	45	14867	1696			1696
3	35	11562				
4	26	8592				
5	28	9253				
6	19	6275				
Sp.	10	3305				
Totals	247	81605	4861			4861

Table 74. Program expenditures by grades: School 5.

1965-66		Regular Programs	Teacher Aides, Adjustment Teachers, Reduced Class Size			Total CE Programs
Grade	ADM	$	$			$
K	135	31659	2716			2716
1	228	53448	4587			4587
2	218	51120	4386			4386
3	201	47116				
4	196	45936				
5	193	45254				
6	139	32590				
Sp.	14	3290				
Totals	1324	310413	11689			11689

1966-67		Regular Programs	Teacher Aides, Adjustment Teachers, Reduced Class Size	Intensive Instructional Improvement		Total CE Programs
Grade	ADM	$	$	$		$
K	163	41841	7285			7285
1	279	71660	12469			12469
2	238	61131	10637			10637
3	224	57506		1700		1700
4	214	54963		1634		1634
5	198	50838		1511		1511
6	198	50838		1511		1511
Sp.	16	4125		122		122
Totals	1530	392902	30391	6488		36879

Table 75. Program expenditures by grades: School 6.

1965-66		Regular Programs	Teacher Aides, Adjustment Teachers, Reduced Class Size		Language Arts Teacher Consultants	Total CE Programs
Grade	ADM	$	$		$	$
K	33	8183	798			798
1	80	19835	1934		2140	4074
2	58	14375	1402		1552	2954
3	36	9822			963	963
4	38	9421			1016	1016
5	22	5453			588	588
6	5	1238			134	134
Sp.	4	992				
Totals	276	68419	4134		6393	10527

1966-67		Regular Programs	Teacher Aides, Adjustment Teachers, Reduced Class Size	Project Quality	Language Arts	Total CE Programs
Grade	ADM	$	$	$	$	$
K	47	12464	1778	102		1880
1	81	21481	3065	176	4242	7483
2	65	17239	2459	141	3405	6005
3	65	17239		141	3405	3546
4	48	12734		105	2514	2619
5	0					
6	0					
Sp.	45	11933		98		98
Totals	351	93090	7302	763	13566	21631

Table 76. Program expenditures by grades: School 7.

1965-66		Regular Programs	Teacher Aides, Adjustment Teachers, Reduced Class Size	English as a Second Language		Total CE Programs
Grade	ADM	$	$	$		$
K	33	9153	803	977		1780
1	56	15539	1362	1658		3020
2	46	12763	1119	1362		2481
3	59	16364		1746		1746
4	27	7493		800		800
5	29	8046		859		859
6	23	6377		681		681
Sp.	54	14976		1598		1598
Totals	327	90711	3284	9681		12965

1966-67		Regular Programs	Teacher Aides, Adjustment Teachers, Reduced Class Size	English as a Second Language	Project Quality	Total CE Programs
Grade	ADM	$	$	$	$	$
K	29	10660	839	1263	71	2173
1	67	24628	1938	2918	163	5019
2	52	19106	1504	2264	127	3895
3	50	18372		2177	122	2299
4	45	16543		1960	110	2070
5	27	9926		1173	62	1235
6	25	9192		1089	61	1150
Sp.	22	8085		958	54	1012
Totals	317	116512	4281	13802	770	18853

Table 77. Program expenditures by grades: School 8.

1965-66		Regular Programs	Teacher Aides, Adjustment Teachers, Reduced Class Size			Total CE Programs
Grade	ADM	$	$			$
K	60	11015	1252			1252
1	120	22043	2504			2504
2	101	18545	2108			2108
3	102	18728				
4	118	21664				
5	115	21116				
6	89	10339				
Sp.	60	11015				
Totals	765	134465	5864			5864

1966-67		Regular Programs	Teacher Aides, Adjustment Teachers, Reduced Class Size	Intensive Instructional Improvement		Total CE Programs
Grade	ADM	$	$	$		$
K	71	18493	3999			3999
1	102	26582	5745			5745
2	108	28132	6083			6083
3	84	21893		684		684
4	86	22397		701		701
5	98	25536		798		798
6	97	25274		790		790
Sp.	71	18493		578		578
Totals	717	186800	15827	3551		19378

Table 78. Program expenditures by grades: School 9.

1965-66		Regular Programs	Teacher Aides, Adjustment Teachers, Reduced Class Size			Total CE Programs
Grade	ADM	$	$			$
K	37	9025	916			916
1	73	17793	1808			1808
2	85	20729	2106			2106
3	69	16818				
4	73	17793				
5	75	18280				
6	84	20485				
Sp.	59	14383				
Totals	555	135306	4830			4830

1966-67		Regular Programs	Teacher Aides, Adjustment Teachers, Reduced Class Size	Intensive Instructional Improvement		Total CE Programs
Grade	ADM	$	$	$		$
K	39	15977	2103			2103
1	69	28259	3721			3721
2	55	22522	2966			2966
3	75	30704		524		524
4	55	22522		384		384
5	70	28663		489		489
6	62	25391		433		433
Sp.	24	9818		168		168
Totals	449	183856	8792	1998		10788

Table 79. Program expenditures by grades: School 10.

1965-66		Regular Programs	Teacher Aides, Adjustment Teachers, Reduced Class Size			Total CE Programs
Grade	ADM	$	$			
K	54	9743	1125			1125
1	103	18586	2146			2146
2	76	13715	1583			1583
3	83	14977				
4	80	14439				
5	70	12639				
6	50	9029				
Sp.	57	10291				
Totals	574	103419	4854			4854

1966-67		Regular Programs	Teacher Aides, Adjustment Teachers, Reduced Class Size			Total CE Programs
Grade	ADM	$	$			
K	41	11430	982			982
1	88	24541	2109			2109
2	74	20642	1773			1773
3	59	16459				
4	83	23143				
5	69	19243				
6	55	15343				
Sp.	13	3631				
Totals	483	134432	4864			4864

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13. ABSTRACT

This report analyzes data from a sample of 132 schools which received funds from Title I for compensatory education to aid educationally disadvantaged pupils. Mose of the eleven school districts from which the schools were drawn were selected because there was reason to believe that successful compensatory education programs were in progress in at least some of the district schools. Conclusions are based on a comparison of achievement scores in 1966-67, after pupils were exposed to compensatory education from Title funds, with achivement scores in 1965-66.

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